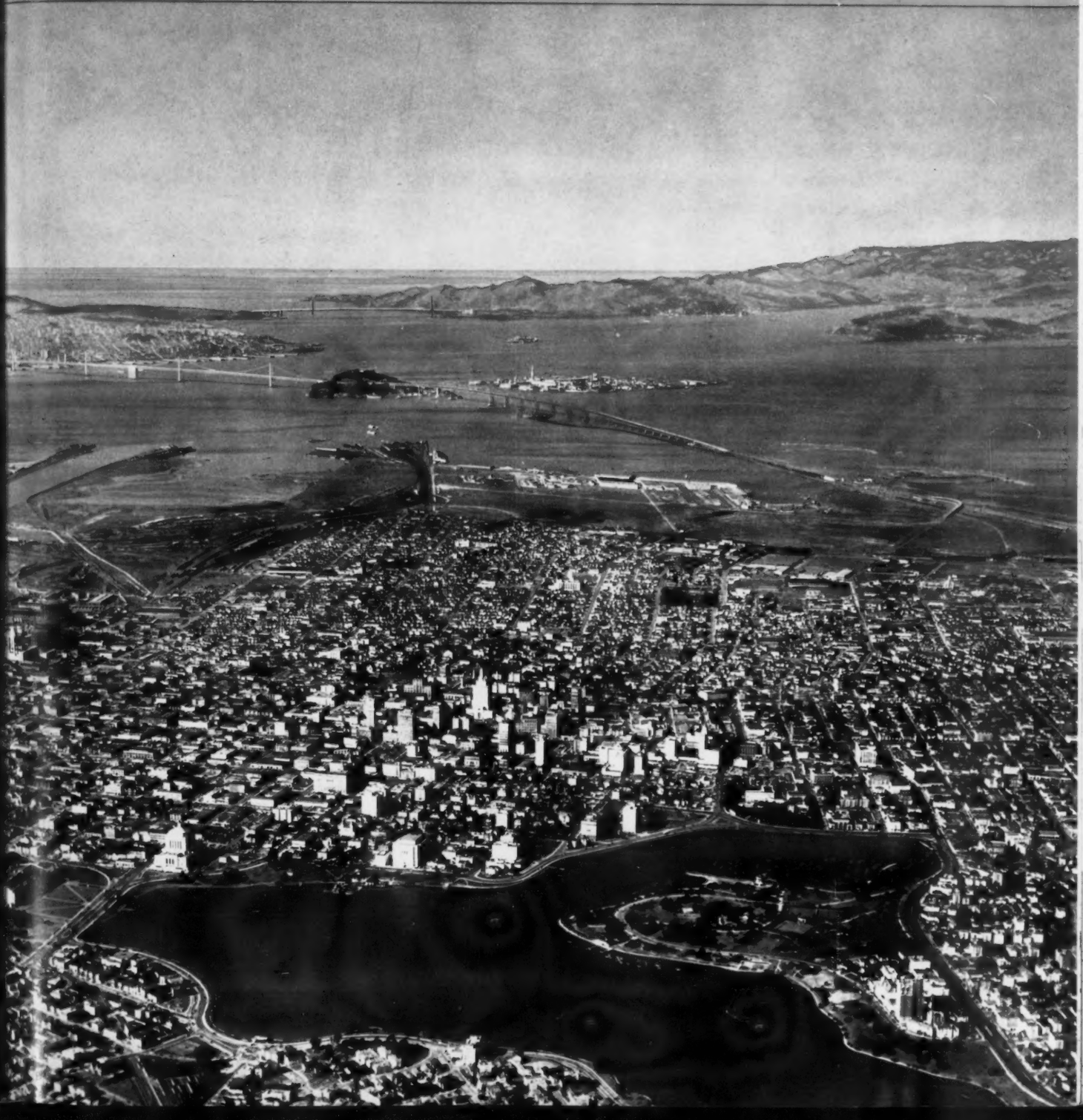
GRAW-HILL CO.
CALIFORNIA

MAY, 1940

25c a Copy

ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS



Comprehensive Electric Range Promotion makes your selling job easier

★ The promotion of modern electric cookery is a full-time job in Edison territory. Month after month —in newspapers and home magazines, on billboards, by special mailing pieces — Edison advertising keeps range prospects aware of the advantages and convenience of modern electric cooking . . . makes your selling job easier.

5-40

Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), May, 1940. Vol. 84, No. 5. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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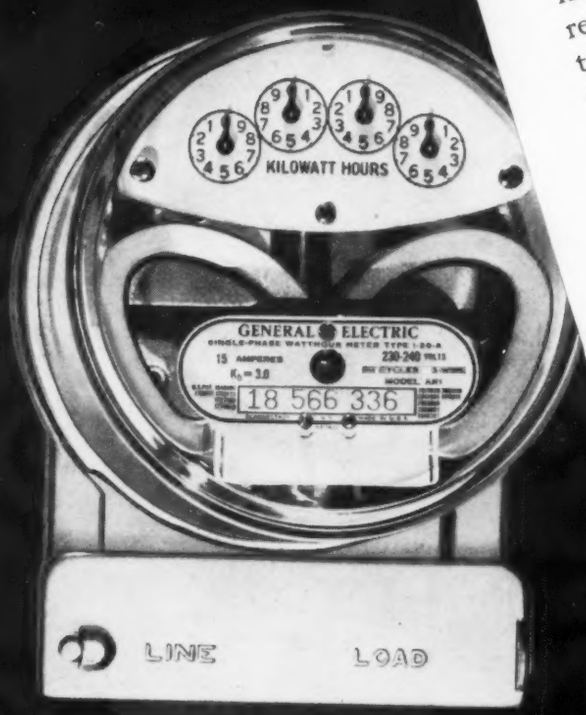
WHY LOW SPEED?

IF THE inherent errors in watthour meters are small, only a small amount of compensation is required to achieve accuracy of registration.

And if the amount of needed compensation is small, the variations caused by manufacturing tolerances and differences in materials are so minute as to be negligible. Thus is greater uniformity made possible — and this is an important goal in the manufacture of watthour meters.

Pertinent to the problem is the established fact that the chief cause of inherent error in registration of heavy loads is the damping torque resulting from the current-coil flux. Since this error is directly proportional to the rotor speed, it follows that the speed should be low.

In order to minimize errors and to limit needed compensation, low nominal speed—which has characterized General Electric watthour meters since 1926—is a fundamental feature of the I-30 line.



GENERAL ELECTRIC

601-1

BETWEEN THIS MONTH'S COVERS

Turn on the Switches

LET THE ISLE BE BRIGHT FOR '40 (p. 29) Electrical outdoor illumination will again be the feature of the 1940 Golden Gate International Exposition. Many new applications in incandescent and fluorescent lamps, spots and floods will be used to lure and lull visitors on Treasure Island. Mistakes in lighting (and there were only a few last year) have been righted and the new effects will make the man-made island even more of a paradise at night than it was last year. Charles Huyck, of Graybar Electric Co., sums up the lighting progress that is being made at Treasure Island today and tells you how the 1940 colors will be bright in theme, in comparison to the 1939 pastel shades.

"Something New"—

SALES SHORTS (p. 34 and 40). Central Arizona Light & Power hits on a new way to sell IES lamps by offering prizes of women's clothes . . . . Electrical Service League of British Columbia organizes a Home Appliance Council . . . . Washington Water Power salesmen go picking "violets" and shower their boss with sales figures on ranges and water heaters . . . . Montana Power lighting salesmen conduct a survey over system in form of check list on uses of lighting . . . . San Francisco man "bridegroom" in Westinghouse ceremony at Western Furniture Mart, San Francisco.

How It's Used

APPLICATION DATA (p. 41): Commercial and industrial sales engineers present three new sets of data on electrical use, dealing with: (1) infra-red drying lamps in an auto-repainting establishment; (2) electric heat for poultry preparation, and (3) electric heat for stereotyping and engraving.

Big Dam

GRAND COULEE (p. 44): Generators are now en route to the big dam on the Columbia, which heretofore has been mainly of civil engineering interest. Pictures show the status quo, and there is a section of a main unit.

Capacitors

CORRECTING ON THE LOW SIDE (p. 46): Engineers keep accumulating new evidence of the value of static capacitors. H. H. Minor, who is with San Joaquin Power Division, PG and E, tells about special factors which make it most economical to apply capacitors to secondaries in that area.

MUSTERING CORRECTIVE KVA. (p. 47): Another aspect of capacitor usefulness is discussed by John F. Roberts, PG and E. He tells how, in the Monterey area, units are mobilized seasonally when fish plants develop large inductive loads. This happens when the fishing's good.

Technical Trend

WHAT EEI IS STUDYING IN EQUIPMENT AND DESIGN (p. 48): Seldom is one able to get a broad picture of current engineering effort without taking a great deal of time. In preparing his resumé for the Northwest Assn., Glen L. Lane, of Washington Water Power, has saved you this time. In one short article you can survey the engineering work which EEI has afoot.

Phase Angle, etc.

CONTROLLING POWER FLOW (p. 50): When a lot of units are assembled in an interconnected electrical system, they behave much like people. Some try to pass all the work to someone else, others try to hog everything. J. F. Spease, of G-E, Portland, discusses the electrical-systems controls which prevent some units from loafing while others are overtaxed.

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Cover: Aerial photo of Bay Area shows scene of two important events in May—the PCEA convention in Oakland, May 22-24, and the 1940 edition of the Golden Gate International Exposition on Treasure Island, opening May 25.

Wolf! Wolf!

WHO'S AFRAID OF FLUORESCENT? (p. 54): Public Service Co. of Colorado decided they weren't going to be licked by what to do with fluorescent lighting. "If we can't lick 'em, we'll join 'em," said Gaylord B. Buck, general commercial manager, challenging the various bugaboos that seem to be following fluorescent lighting wherever it goes. Under H. T. Rankin, lighting service department manager, Public Service is selling fluorescent lighting and selling it hard. The result has been amazing and throws a new light on sales tactics in regards to other similar utility problems.

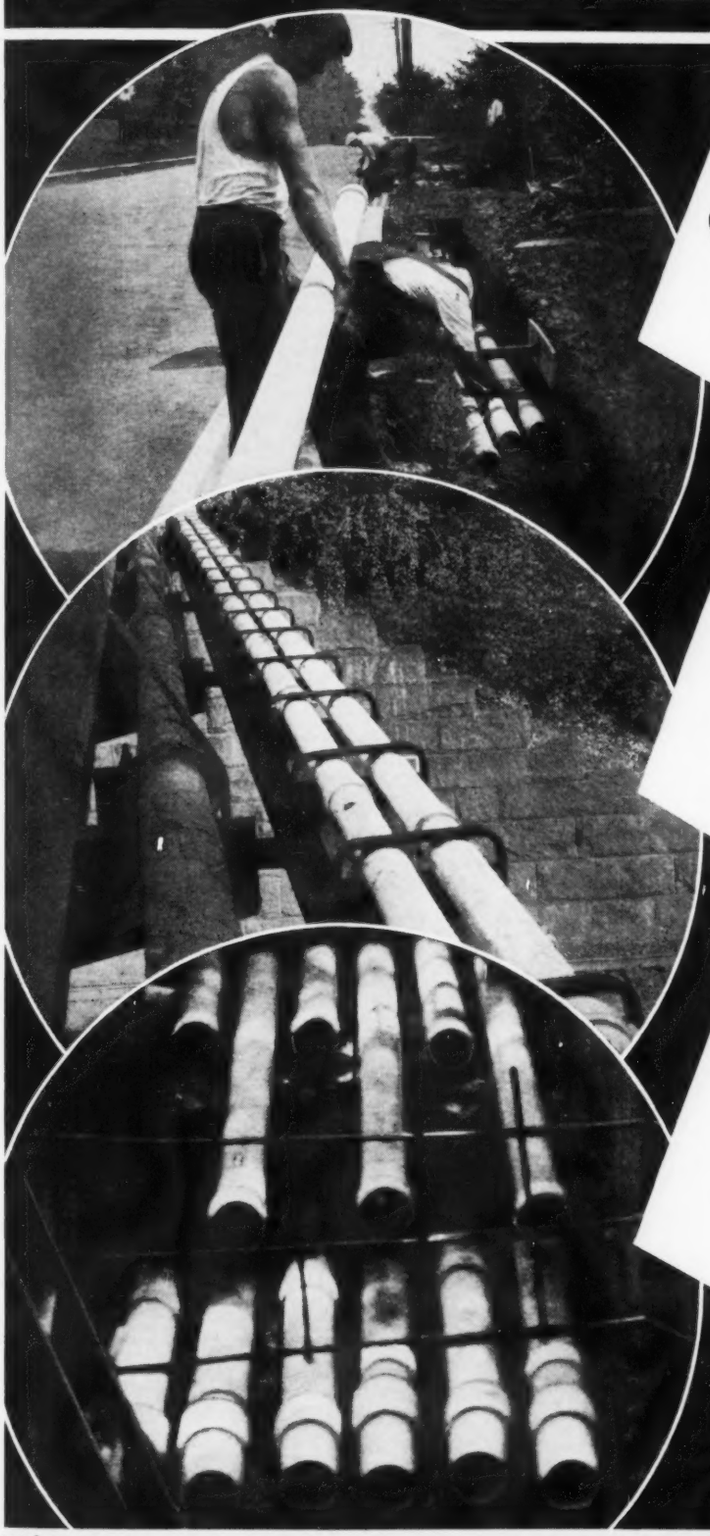
Rap the Gavel

PCEA PROGRAM (p. 62): It's practically here! On Wednesday morning, May 22d, when P. M. Downing calls to order its opening session, the 1940 PCEA convention will be under way. For three days, hundreds of electrical men in the West and other parts of the country will gather to exchange ideas and review the progress the industry has made through the year. A well-planned program is listed completely in this issue giving you a preview of what's ahead.

For Immediate Release

NEWS OF THE INDUSTRY (p. 70): Supreme Court holds San Francisco power contract with PG and E illegal . . . . Utah Supreme Court holds that non-electric power cooperatives are not public utilities . . . . Federal Court sets purchase price on Washington G&E property at $6,011,556 . . . . Consumers Non-Profit Public Power Corp. plan for acquisition of some Puget Sound property . . . . PG and E signs contract with Southern California Edison Co. for power . . . . New bill to revise financial arrangements for sale of Boulder Dam power has been introduced in Washington, D.C. . . . . Aluminum Company of America signs another contract with Bonneville . . . . Seattle City Light inter-ties with Bonneville for surplus power . . . . Portland backers of PUD reserve Bonneville power . . . . Rate reductions declared by California-Oregon Power Co., Mountain States Power Co. . . . . Parker Dam project appropriations cut.

THIS DURABLE CONDUIT



COSTS LESS TO INSTALL

Uniformly strong and durable, J-M Transite Conduit retains its true form under sustained loads—requires no concrete envelope underground or in exposed locations. Its long light lengths are easily handled, rapidly installed.

COSTS LESS TO MAINTAIN

Made of asbestos and cement, Transite Conduit is highly resistant to smoke, acid fumes, weather and corrosive soils. It will not rust, rot or decay, is completely incombustible, offers unusual resistance to flame and arc. Maintenance costs are kept to a minimum.

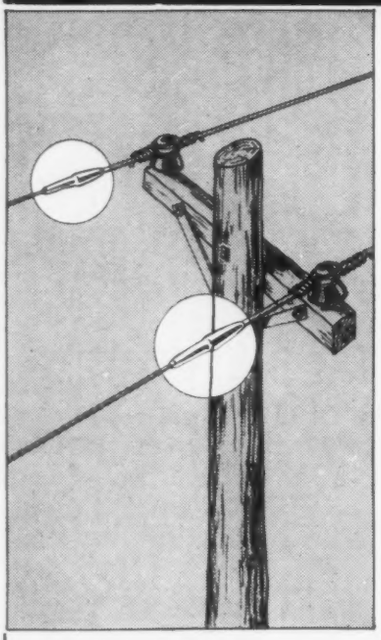
RETAINS ITS SMOOTH BORE

The original smooth interior of Transite Conduit *stays* smooth in service. Joints are tight and snug—free from jagged obstructions. Therefore, cable pulling is easier—long pulls may be made without injuring the sheath—cables can be easily removed.

You should have complete information about Transite Conduit and its thinner-walled companion product, J-M Transite Korduct. Write for Brochure DS-410. Johns-Manville, 22 East 40th Street, New York, N.Y.

Johns-Manville TRANSITE CONDUIT

modernize
YOUR
DISTRIBUTION
PRACTICE—



Urban construction where line drops portion of load and smaller wire size will carry current flowing through the rest of circuit.

RELIABLE
STRAIGHTLINE
REDUCERS . . . .

Save money and clean up appearance while eliminating a double dead-end. Sag of larger wire is only increased two or three inches as spans of city distribution are short.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE - CHICAGO ILLINOIS

NEW PRODUCTS

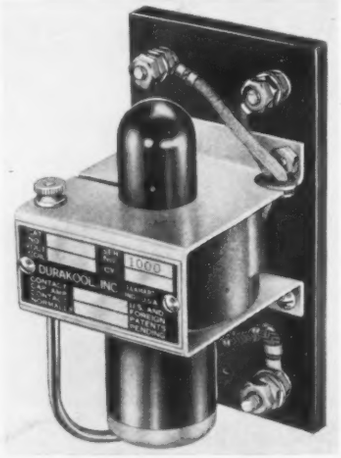
Westinghouse Range (501)

Addition of two new range models to the Westinghouse 1940 line has been announced by the merchandising division. One of the new models, the Chieftain, is designed to meet the demand for a range fully skirted to the floor in the $100 price class. This model is a divided top range, while the other (illustrated) model, the Diplomat, has a full-sized

range with three storage drawers, one of which may be equipped with a warming element if desired. It has three five-speed Corox units and a five-speed economy cooker, a full-sized balanced heat oven with a single dial control and other features.

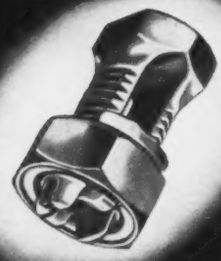
Mercury Relay (502)

A mercury relay manufactured by Durakool, Incorp. utilizes the unbreakable metal body of the Durakool mercury switch and the displacement principle with solenoid action. The contact structure is hermetically sealed, making the relay especially suitable for use in corrosive and explosive atmospheres. It may



be operated up to 300 times per minute. There is little friction and no wear in operation. The relay requires no maintenance or attention.

Check these FEATURES



- One-piece with no extending parts to interfere with taping.
- Made completely of Duronze, actually stronger than steel.
- All corners rounded—will not nick wires.
- Full threads on screw.
- Large head on bolt at no additional cost.

Specify Blackburn
JASPER BLACKBURN
PRODUCTS CORP.
Main & Clinton Sts. ST. LOUIS, MO.

BIGGER PROFITS
BETTER PRODUCTS

1. "Wire-Nuts." — Solderless — tapeless Wire Connectors, Skin wires — Screw on — That's All! One size for all common wiring joints. Fully Approved. MILLIONS IN USE!

2. "E-Z" Wire Strippers. — Strip the toughest insulations without nicking or cutting strands. Strip solid or stranded wires from No. 30 gauge to No. 5.

3. Cable Ripper. — Easily and quickly rips non - metallic sheathed duplex or lead covered cable.

4. Joist Boring Machine.—Ends tiresome and dangerous reaching. Bores at any angle—reaches up to 11 ft.

5. Fuse Clip Clamps.—For Ferrule or Knife type clips. Seven sizes.

6. Fish Tape, Reel & Puller.—NOW fishing IS a pleasure. Keeps tape reeled up—no expensive tape breakage — no "live" contacts. NEW! "Junior No. 0" size—$2.50. Easily fits in tool kit.

7. Test - Lite & Fuse Puller.—Tests live circuits. Pul's fuses.

8. Fuse Reducers. — Stop over fusing. Many sizes.

9. Fuse Pullers. — Laminated fibre, four sizes.

IDEAL SOLD THROUGH JOBBERS
Electrical Products Division
IDEAL COMMUTATOR DRESSER COMPANY
1042 PARK AVENUE SYCAMORE, ILLINOIS

PRINT IN BINDING

YOU SAY YOUR ELECTRIC RANGE WON'T WORK MRS. JONES? I'LL BE UP IN A JIFFY.
RANGE UNIT HAS ED OUT, BUT I CAN LACE THAT RIGHT AWAY.
WHAT! YOU DON'T HAVE TO SEND AWAY FOR A UNIT?
THIS IS A CHROMALOX UNIT, MRS. JONES. IT WILL FIT YOUR RANGE — AND YOU'LL LIKE IT FINE, TOO!
SEE HOW FAST THE CHROMALOX UNIT HEATS UP!
YOU'RE RIGHT THIS IS THE UNIT I'VE DREAMED OF!
WELL, THAT'S ONE MORE TIME I HAVE CHROMALOX UNITS TO THANK FOR A QUICK JOB AND A SATISFIED CUSTOMER!

MAKE RANGE UNIT REPLACEMENTS QUICK AND PROFITABLE WITH

CHROMALOX! RANGE UNITS

WHY TIE UP MONEY in a varied stock of range units for replacements when you're set to fit **any range** with a few dozen inexpensive Chromalox **Stainless Steel** chrome-plated adaptor rings and a small stock of Chromalox Unit assemblies? Snap on the proper adaptor ring, connect up the terminals, and you've made another happy kitchen, and another Chromalox booster.

Show your customer how she can avoid wasted heat, with the Chromalox "two-units-in-one" feature which provides the heated area to fit the utensil . . . point out how the all-flat top cooks by **conduction,** by actual contact of unit and utensil, cooking faster with less heat . . . emphasize how easy it is to clean that flat-top . . . endeavor to get her to regard the new unit as a demonstration unit. Call 'round again in a week or so, and talk about a new all-Chromalox-equipped range, based upon the fact that she is probably using the new unit whenever possible because she likes it better. Many a Chromalox replacement leads to a new range sale, sooner or later, by building greater acceptance for the electric range.

You will profit by the sales tips in the book "HOW TO SELL MORE RANGES." It's free—write

EDWIN L. WIEGAND COMPANY

7540 Thomas Boulevard PITTSBURGH, PA.

Write us or our nearest representative

MONTGOMERY BROTHERS

911 Western Ave., Seattle, Wash. • 1501 N. W. Kearny St., Portland, Ore.
61 Fremont St., San Francisco, Cal. • 420 S. San Pedro St., Los Angeles, Cal.
THE PETERSON COMPANY • 1921 Blake Street, Denver, Colo.

More

Here's Greater Value AT NO EXTRA COST!

1. Revolutionary Cadmium-plated 3-Way Terminal Cuts Installation Time... Simplifies Wiring Job... Minimizes Electrolytic Action on Copper or Aluminum Conductors.

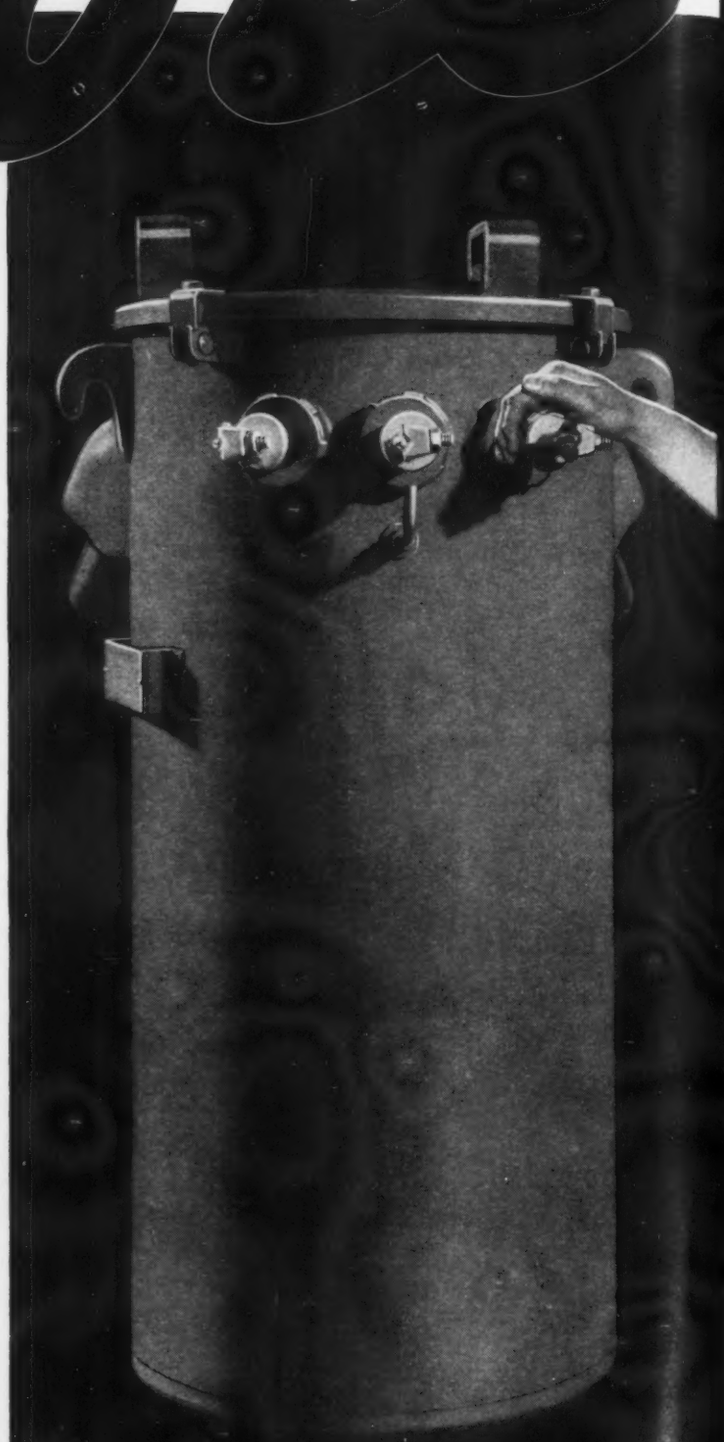
2. New, Durable Steel Tank, Tested Under Pressure ... Prevents Oil Leakage ... Assures Long Life.

3. New Spra-bonderizing... Plus Triple Coat Automobile Finish ... Gives Positive 4-Way Rust Protection.

4. Double Conductor Insulation Provides Double Safety Against Winding Failures.

5. Time-proven Core and Coil Construction ... Designed for Years of Efficient, Service-free Operation.

6. Extra-heavy Porcelain Coordinated Bushings with Liberal Creepage ... Offer Maximum Reliability Under Fog, Dust, Chemical, or Other Adverse Operating Conditions.



AC

ALLIS-CHALMERS DISTRIBUTION

MONEY-SAVING FEATURES!

New Allis-Chalmers Distribution Transformer First With Cost Cutting Improvements!

Added quality in every detail . . . added design features that point the way to greater all-around dependability at lower costs — that's the new Allis-Chalmers Distribution Transformer . . . on the market today!

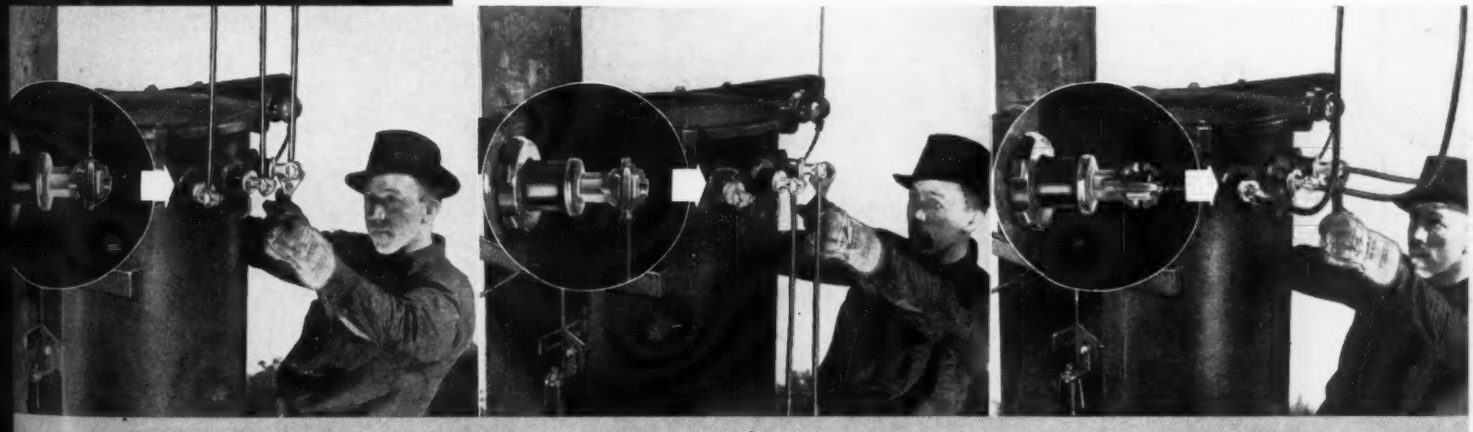
With the big cadmium-plated 3-way terminals you save man hours . . . eliminate complicated wiring jobs.

Equally important . . . you don't have to buy special fittings . . . for the heavy cadmium plating not only reduces corrosion . . . but at the same time actually minimizes electrolytic action when used with copper or aluminum conductors.

What's more, there's new design perfection of core and coils . . . dictated by over 40 years of Allis-Chalmers experience in building distribution and power transformers for utilities all over the world. All windings are double insulated for added safety — double protection against winding failure.

But that's only part of the story! This new Allis-Chalmers Distribution Transformer . . . with all its money saving features costs no more than ordinary distribution transformers.

For complete information . . . call the nearest Allis-Chalmers District Office . . . or write Allis-Chalmers, Pittsburgh Works, Pittsburgh, Penn.



SEE HOW THE NEW 3-WAY TERMINAL WORKS! Perfected 3-Way Terminal is standard equipment on all new Allis-Chalmers Distribution Transformers. First and second pictures show how simply and easily leads can be brought to the transformer from both top and bottom. But you don't stop there! For in the third picture is illustrated an *extra* advantage you get with no other terminal! If necessary . . . leads can be brought straight out from the transformer . . . without making an extra bend in the conductors or complicating the wiring job. Notice how the tightening tool travels in an *up and down* direction eliminating the chance for accidental short circuits across the secondary terminals. Notice, too, that a standard line-man's wrench is used. No special tools are needed. You don't have to buy extra fittings. Heavy cadmium plating of the 3-Way Terminal makes it possible to be used with *both* copper and aluminum conductors with a minimum of electrolytic action. A-1231

TRANSFORMERS *Cut Operating Costs*

PRINT IN BINDING

Hotpoint Water Heater (503)

A new Hotpoint automatic electric water heater—the 10-gal. Master model, has been designed for small homes without basements, where installation must be made in living quarters, and for small commercial and industrial applications requiring 24-hour automatic hot water service. It has white Calgloss finish, making it ideal for installation in kitchen, bathroom, or utility room; or it may be installed in a closet. It has a single Calrod immersion unit. The 300 lb. test pressure tank is of galvanized metal. Water temperature may be maintained at any desired point, from 120 deg. to 190 deg. F., by means of the Thermosnap.

Meter Troughs (504)

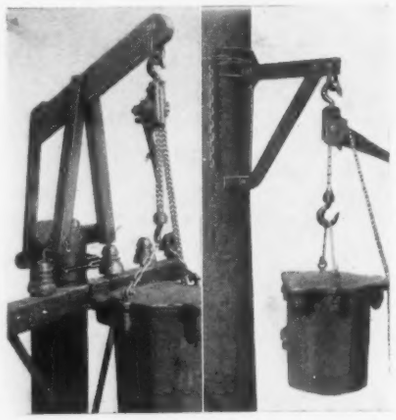
Designed to meet every trough treatment, there is now available, through the Electrical Division of Colt's Patent Fire Arms Mfg. Co., a complete line of standardized meter troughs. They are furnished for indoor installations of sheet steel with baked aluminum finish or sheet aluminum, natural finish, or for outdoor installations, in galvannealed steel with baked aluminum finish, or sheet aluminum, natural finish. Indoor types have removable endwalls so that continuous troughs of any desired length can be assembled by means of a coupling strap.

Test Kits (505)

Test kits for plant electricians and electrical contractors have been assembled by the Herman H. Sticht & Co. These instrumental kits contain ammeter, voltmeter and transformer and weigh only 10 lb. Component parts may be used individually without tying up the whole outfit on any one test. And the current transformer itself will find many additional applications in industrial plants.

Transformer Gins (506)

Two new transformer gins have been manufactured by the Coffing Hoist Co. The gin (left) can easily be clamped on the top of a pole for lifting transformers, load pots, lead cables, etc. It is so constructed that it is a non-conductor of electricity. The latest gin



(right) is designed to clamp on the side of a pole. These gins fit any size pole and have been tested to more than 3,000 lb. without any signs of yielding.

Electric Stop Watch (507)

An electric stop-watch, governed by a generating station master clock has been developed by the Precision Scientific Co. Called "Timelt," this watch is run by a synchronous electric motor whose speed is precisely controlled by the power house master clock

which governs the cycle constancy of alternating current. Time intervals up to 2 hrs., 46 min., can be read directly to 1/10 of a second. Counter can be reset to zero from any reading.

Lo-Amp Motor (508)

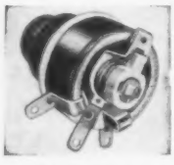
A new "Lo-Amp" electric motor that is especially designed for use on refrigerating and air conditioning and similar installations has been presented by the Louis Allis Co. It has a low-locked rotor current, with no centrifugal switches, relays, brushes or slip rings. It does not require any expensive special control to operate, such as multi-step starters.

G-E Water Heater (509)

Two new electric water heaters, one round and the other square in shape, have been introduced by General Electric. The square-shaped heater has a 18-gal. capacity and is approximately 21 in. in diameter, 36 in. high. It was designed to be used next to a G-E

electric range or other standard height appliance or cabinet. A backsplasher can be supplied as an accessory, which has the same thickness of a G-E range so that it lines up evenly in installation.

Speed Regulator 1101



Ring Type Rheostat 1105

when Fan Controls

TAKE A BEATING!

WARD LEONARD Motor Speed Regulators include everything from the small ring type rheostats for window ventilators to the heaviest industrial blower controls. Well planned arrangements provide circulation of air around resistance elements to dissipate the generated heat. Ward Leonard Speed Regulators will therefore operate continuously, at any speed setting, in the hottest weather without overheating, and if it's automatic control for air conditioning you will be interested in Ward Leonard Multi-Speed Motor Starters.

SEND FOR BULLETINS OF INTEREST

BULLETIN 1101
describes Ward Leonard Speed Regulator, ventilated and enclosed types 1/20 to 1/3 H. P.

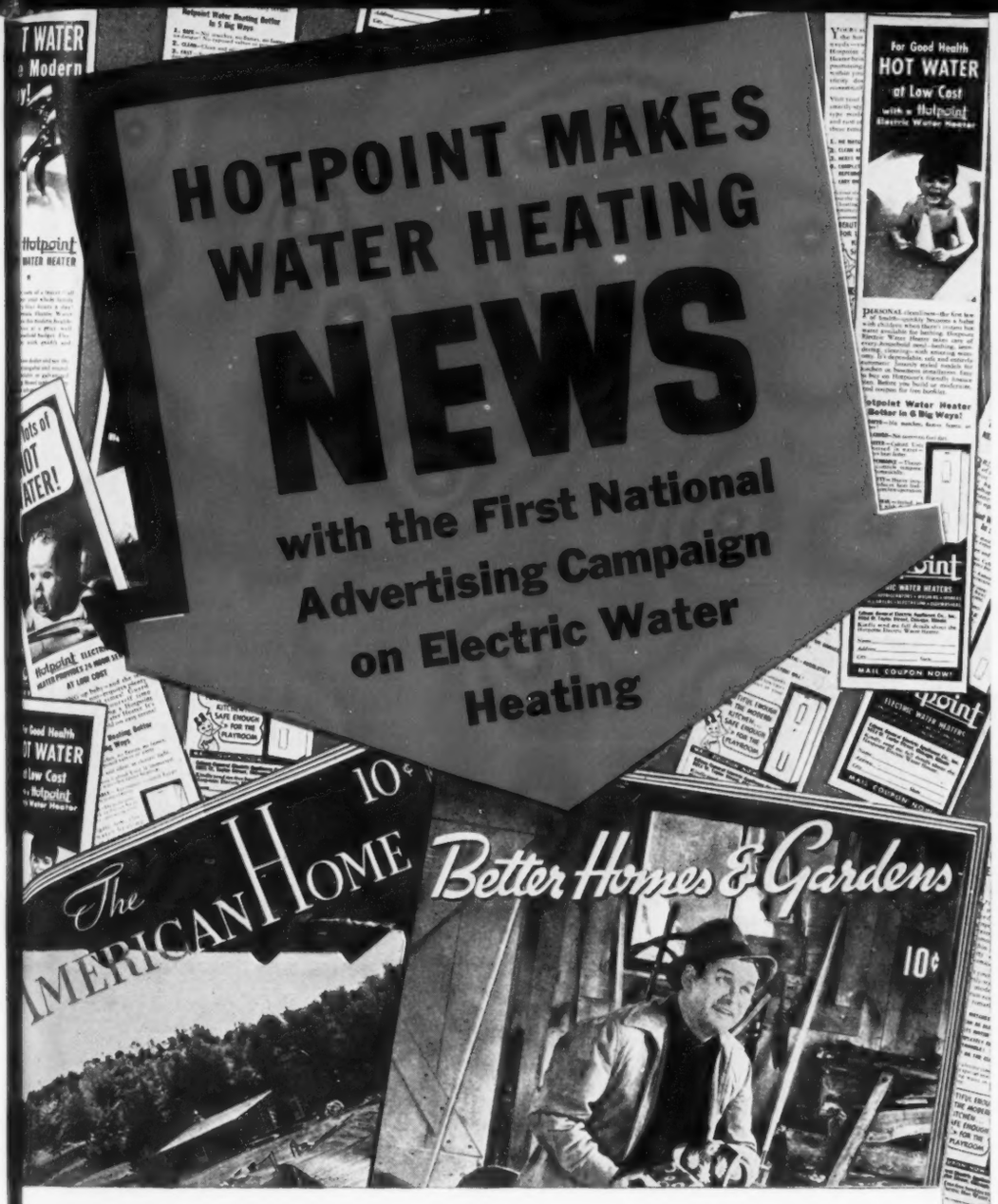
BULLETIN 1105
describes Ward Leonard Vitrohm Ring Type Rheostats 1½" 2¼", 3" and 4" diameter for 30, 50, 100 and 150 watts.

BULLETIN 4061
describes Multi-Speed Starters.

WARD LEONARD ELECTRIC COMPANY

48 SOUTH STREET MOUNT VERNON, N. Y.

Electric Controls Since 1892


HOTPOINT MAKES WATER HEATING NEWS
with the First National Advertising Campaign on Electric Water Heating
The AMERICAN HOME
10¢
Better Homes & Gardens
10¢

Nearly 25,000,000 Advertising Messages

HOTPOINT is the first Electric Water Heater manufacturer to use national advertising to stimulate sales for YOU. Every month, beginning in April, Hotpoint Water Heater National Advertising appears in the two well-known home magazines, AMERICAN HOME and BETTER HOMES AND GARDENS.

People who are thinking of building and remodeling read these two home-building magazines. That is why they were selected to carry the advertising of Hotpoint Electric Water Heaters.

There was a large increase in the number of homes built in 1939. There will be a larger increase in 1940.

AMERICAN HOME and BETTER HOMES AND GARDENS reach these prospects with a total of nearly 25,000,000 Hotpoint Water Heater advertising messages. Buyers in your community will see these messages, so get ready NOW for YOUR share of Hotpoint Water Heater sales. See your distributor or write for information today!

New "SAFE-T-SEAL" Bond for Calrod Water Heating Units

"SAFE-T-SEAL" Bond, a new non-conducting material for sealing Calrod Units, greatly increases the life of the unit, and reduces possibility of interruptions in the water heater service.

More Hotpoint features that make sales for you

CALROD, Hotpoint's airtight heating unit, is immersed directly in the water inside the tank. All heat generated is delivered to the water. No waste. No flame. No fire hazard.

THERMOSNAP, Hotpoint's automatic temperature control, makes Hotpoint Water Heaters safely automatic.

DESIGNED by industry leaders and world's largest manufacturer of electric water heaters.

Hotpoint has pioneered more exclusive features than any other manufacturer in the field.

Water heating activity greater now than ever before in history!

More building activity—Boom-time home building means more sales for you. New homes need water heater service. Hotpoint national advertising in home magazines helps you sell.

More people recognize advantages—The old saying, "A satisfied customer is your best salesman" means something to Hotpoint retailers. There are more owners—more satisfied customers—of Hotpoint Water Heaters than any other make.

More utility executives realize the value of Water Heater load each day. This extra load increases net earnings with small additional investment. Utilities benefit—1. On Sales. 2. On Load.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 West Taylor Street, Chicago, Illinois

Enter the MKB Window Display Contest

Hotpoint will pay duplicate prizes to all National winners who use exclusive Hotpoint window displays in the MKB Contest. Make more than one entry. Improve your chances to win.

Hotpoint

AUTOMATIC ELECTRIC WATER HEATERS

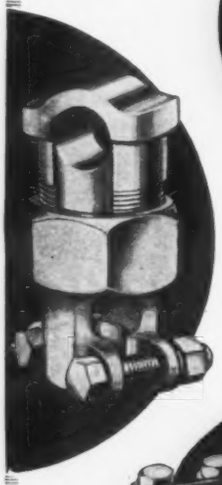
ELECTRIC RANGES • REFRIGERATORS • WASHERS AND IRONERS • CLOTHES DRYERS • DISHWASHERS • ELECTRASINK

ALL Kinds of Fittings—

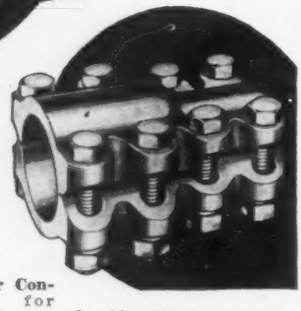
for every type of electrical connection. For any combination of tube, bar, cable, or wire.

More than 6,200 items.

Clamp Type Tees in all sizes. High copper alloy; machined contact surfaces



Self-Locking Tees that hold permanently tight. With and without extension.



Reducer Connectors for different sizes of cable. High copper with Everdur bolts, nuts, lockwashers.

You will be interested in the many NEW and IMPROVED fittings in the Penn-Union Catalog. Every item thoroughly tested, Dependable.

NICHOLAS & COOK
1063 HOWARD STREET
SAN FRANCISCO

J. W. WATKINS
538 SKINNER BLDG.
SEATTLE

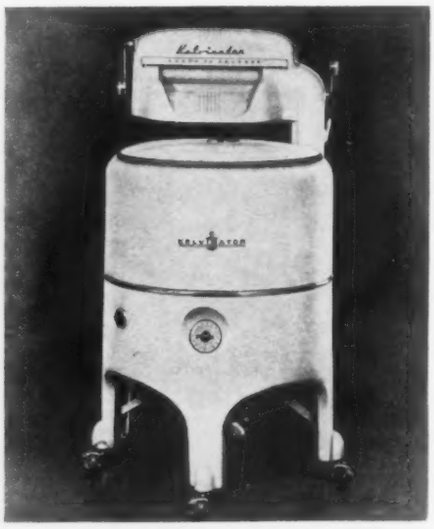
PENN-UNION ELECTRIC CORP., Erie, Pa.

You'll find it in the *complete* line

PENN-UNION
Conductor Fittings

Kelvinator Washer (510)

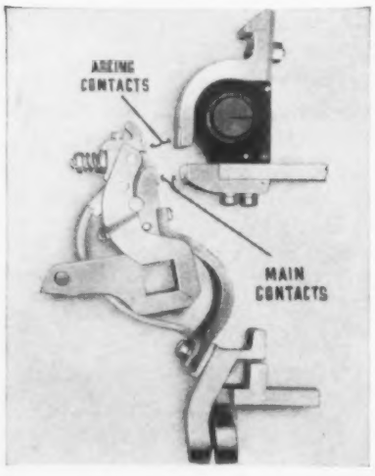
Stressing five fundamental features as a key to increased washer sales, the Kelvinator division of Nash-Kelvinator Corp. presents a new line of 1940 washers, said to incorporate many new advances for safer, more convenient home laundry. Consisting of four models, the new line has been designed to give dealers a simple, five-point selling program. The



five features were given as: a safe wringer; an agitator that washes fast and clean without damage to clothes; a mechanical unit that is efficient and quiet; and beauty of design and dependable construction together with a name that means over-all dependability.

Contact Structure (511)

A new contact structure, employing Gibsiloy Grade A-3 on the main contacts has been developed by the I-T-E Circuit Breaker Co. for their new type Kb circuit breakers. The main contacts, shown in the illustration, consist of silver-nickel blocks electrically brazed to heavy copper bars. Grade A-3 is only one of the several grades of Gibsiloy powdered



metals used in the production of electrical contacts. Each grade has individual physical properties, depending on its composition. It can be furnished in a wide variety of shapes for practically any contact design.

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Deposit your pay check . . . send money home . . . handle most banking details in your spare time while traveling. Wherever you go our Bank-by-Mail Service is as convenient to you as the nearest mail box. Here is a really helpful service. Why not take advantage of it?

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STRENGTH, ruggedness and durability are combined with definite economy in *Crapo* Galvanized Steel Strand. Low first cost, low maintenance expense are matters of record wherever this time-tested product is in use. Available in all standard grades and sizes from representative jobbers throughout the country. Or, write—

INDIANA STEEL & WIRE CO.
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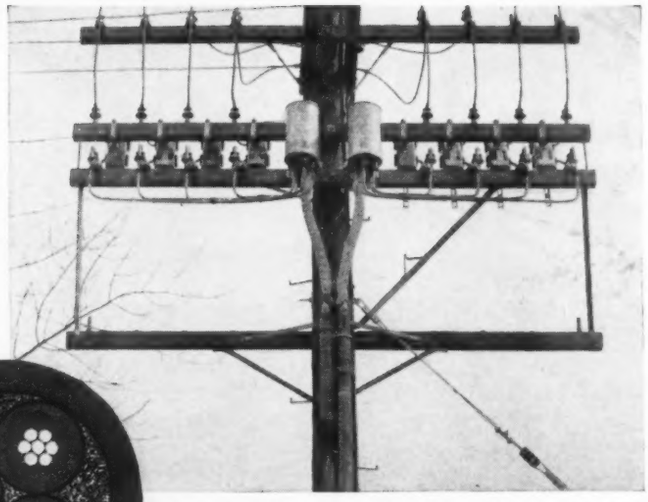
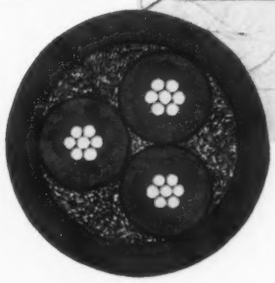
CABLE PROTECTION
in its simplest form



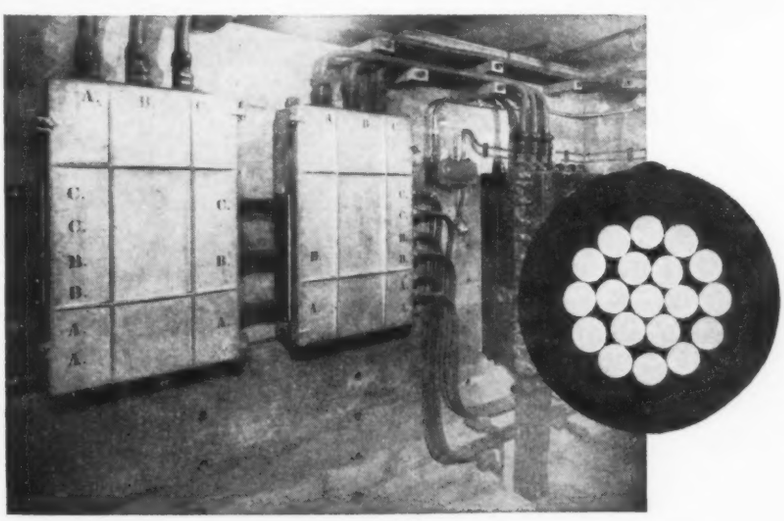


Okosheath-jacketed high-voltage feeder cable with Okolite-insulated conductors. In this installation pole-riser connections were made in a terminating joint.

Against moisture, corrosion and mechanical damage, Okosheath makes the ideal non-metallic cable covering. On single conductor cables one thickness of Okosheath rubber provides protection all the way in to the conductor and insulation all the way out. On multiple conductor cables an Okosheath rubber jacket gives lasting protection and, in addition, provides extra insulating value.

Okosheath multi-conductor signal cables buried directly in the ground. The tough Okosheath jacket protects against soil corrosion and mechanical damage.

Okosheath-insulated single conductor cables for low voltage secondaries in a duct installation. Insulation and mechanical protection are combined in a single covering.



For complete information
Write for Bulletin OK–2013

THE OKONITE COMPANY
Founded 1878
EXECUTIVE OFFICE: PASSAIC, NEW JERSEY
HAZARD INSULATED WIRE WORKS DIVISION
THE OKONITE-CALLENDER CABLE CO., INC.
SALES OFFICES IN PRINCIPAL CITIES

You Ought to Know About Benjamin's

LATEST FLOODLIGHT DEVELOPMENT

The New BENJAMIN ALZO-LITE with New *Watertight* Cover!

Subjected to a fifty-pound pressure stream of water for 100 hours . . . and still no sign of leakage!

Bathed in a continuous bath of steam for 500 hours . . . and not a sign of seepage!

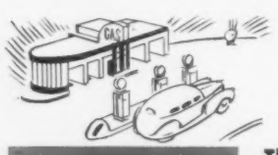
Such are the weather-proof, vapor-proof, dust-proof, and heat-resisting qualities of the new Benjamin Alzo-Lite 750-1500 watt Floodlight with its new water-tight cover.

This new cover provides a positive seal against breathing and seepage of moisture into the reflector and thus prevents bulb breakage caused by the condensation of such vapors. Moreover, this cover protects the reflector from dust and clouding, reducing the frequency of cleaning.

Servicing is simplified by a hinged cover and by a Positioning Stop Mechanism which permits tilting of the reflector upwards for cleaning from above and returns it to the same position at which it was positioned and focused at the time of installation. The cover is hinged to the floodlight and held in place by hand-operated clasps. Thus there is no danger of droppage—no need for tools to open or close the cover.

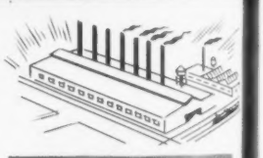
With the new Benjamin Water-Tight Cover, the Alzo-Lite unit as described in Bulletin Number 4543 is especially desirable for floodlighting of football and baseball fields, playgrounds and other outdoor locations such as construction areas, yards, strip mines, etc. For further details and descriptive bulletin on the new Water-Tight Cover . . . Address the Benjamin Electric Mfg. Co., Des Plaines, Ill

● *Illustration shows Alzo-Lite Medium Spread Type: Alzo-Lite units are available in two types of distribution—concentrating and medium spread.*



YOU CAN DEPEND UPON BENJAMIN FLOODLIGHTS

To Embody Every Known Feature of Design and Construction That Contributes to Efficient, Longer-Lived, Economical Performance and Easier Servicing



The Benjamin Duo-Service Floodlight for Service Station Floodlighting

1. **Two-in-One Floodlighting**—porcelain enamel reflector floodlights grounds, inner reflector directs high intensity spotlight beam on station buildings. 2. **Lifetime Efficiency**—porcelain enamel reflector surface never wears out. 3. **Rock-hard Surface**—dirt or grime cannot penetrate or scratch porcelain enamel. 4. **Easy To Clean**—soap and water quickly restores porcelain enamel to original high lighting efficiency. 5. **No Deterioration**—reflector surface cannot decompose, disintegrate or oxidize. 6. **Weatherproof**—unaffected by smoke, rain, snow or other weather conditions. 7. **Patented Saflox Feature**—permits lowering reflector and cleaning from ground . . . faster, safer, easier.

The Benjamin Ellipto-Lite Floodlight for General Floodlighting

A wide angle open-type floodlight. Combines the unexcelled light diffusion properties of porcelain enamel reflecting surface for lighting a large area with an inner Alzak aluminum auxiliary reflector which furnishes a high intensity spotlight beam. The Ellipto-Lite is particularly suitable for floodlighting outdoor sports areas, playgrounds and parking lots. Unique hood construction permits removing reflector for easy cleaning on the ground without disturbing socket, wiring or position of bracket.

BENJAMIN ELECTRIC MFG. CO.
Des Plaines, Illinois

I Want To Know All About ☐ The ALZO-LITE with new Water-Tight Cover ☐ The Duo-Service Floodlight ☐ The Ellipto-Lite Floodlight ☐ The Column-Lite ☐ Other Benjamin Floodlights.

Send Me Bulletins On Items Checked Above.

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MAIL THIS COUPON TODAY AND RECEIVE without cost or obligation FREE BENJAMIN FLOODLIGHT BULLETINS

BENJAMIN

TRADE MARK

LIGHTING EQUIPMENT

A not so merry "MERRY-GO-ROUND"

This is a precision rotating-tray, air circulated aging oven through which Anaconda engineers determine best oils for cable saturants.

Cable oils sent to the rotating tray may be doomed, for here their ability to resist "breakdown" is determined

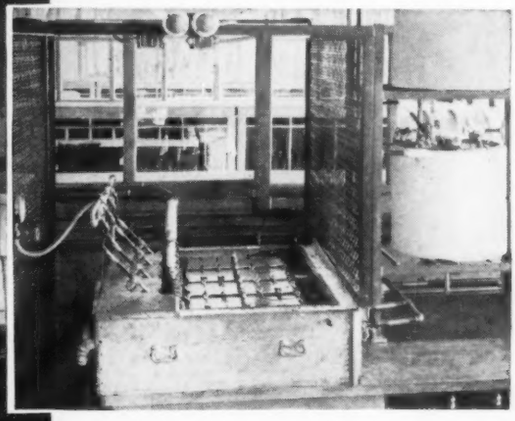
CAREFUL research keeps cable users from the predicament of the small boy who finds that the "merry-go-round" has broken down. Anaconda engineers continually are building greater resistance to "breakdown" into Anaconda wires and cables through tests such as the one shown here.

It is an oil aging oven in which there is less than ½° total temperature differential at all times. It is a severe test for the oils and only those that stand up... those that show the greatest chemical and electrical stability... are chosen. Further improvements in cable saturants are facilitated by laboratory methods of saturating tape wound cable models and subjecting them to cycles of elevated temperature and stress.

Painstaking research methods like these can mean but one thing to you . . . that wires and cables bearing the Anaconda trademark are of the highest quality.

ANACONDA
from mine to consumer

40351



Above—cable model tanks mounted in thermostatically controlled bath with high-voltage vacuum and pressure entries.

•

Left—dielectric properties of cable models under test are studied by means of this bridge.

USE MODERN IMPROVED **Anaconda Wire & Cable**

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York City; Chicago Office: 20 North Wacker Drive

Subsidiary of Anaconda Copper Mining Company. Sales Offices in Principal Cities

FLUORESCENT
INSTALLATIONS
Are FASTER • EASIER
In Existing Buildings With
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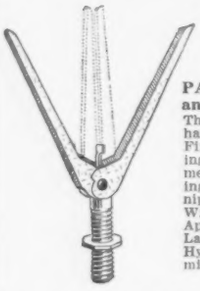

That Give Permanence To Tubing or Chain Type Suspension.

•

PAINE OUTLET BOX and FIXTURE HANGER
The most efficient anchor for hanging large Fluorescent Fixtures with chain or tubing suspension from tile, metal, lath and plaster ceilings. Key through center of nipple locks wings securely. Will hold up to 200 lbs. Approved by Underwriters' Laboratories, U. S. A., and Hydro-Electric Power Commission, Canada.

PAINE BUTTON-HEAD MUSHROOM TOGGLE BOLT
An ideal anchor for hanging the smaller Fluorescent Fixtures in hollow ceilings — Adaptable for tubing or chain-type installations. Spring spreads wings automatically, providing secure anchorage.

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Lock fuses and clips together

KANTARK FUSES
With genuine fibre tubes (not paper)

COLORTOP PLUG FUSES
The color tells the size

FUSE PULLERS
Pull and replace fuses safely

GLASS OILERS
For motors, line shafts, solid bearings etc

UNBREAKABLE OILERS
"Opto-Matic" Constant level type
Gravity Feed type

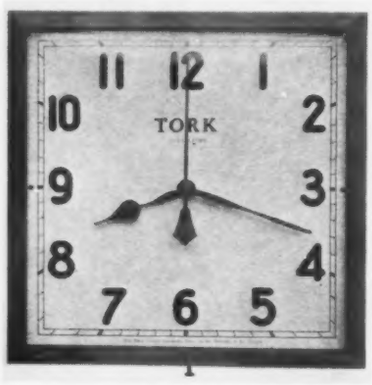
WRITE FOR FOLDER CPF-300

TRICO FUSE MFG. CO., Milwaukee, Wis.

M. L. Woodard, 367 9th St., San Francisco
W. E. Young Co., 1944 Broadway, Denver

New Wall Clock (512)

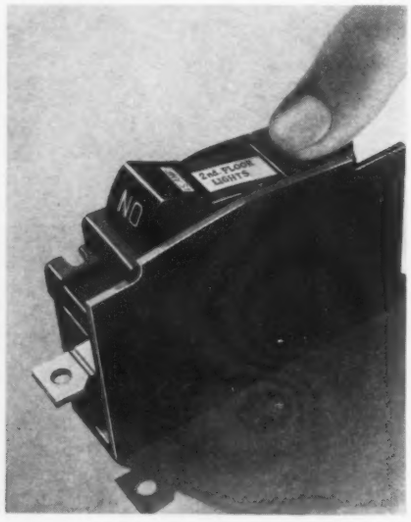
A new 14 in. wall clock for offices, stores, schools, factories and shops has been introduced by The Tork Clock Co., Inc. This handsome clock has a sweep second hand, is



self-starting, and may be procured in walnut or white enamel. There is a curved glass front, mitered wood case and convenient set knob.

Circuit Breaker-Switch (513)

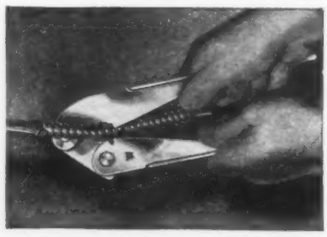
A combination switch and automatic circuit breaker has been developed by the Bull Dog Electric Products Co. This unit is used for snap-action, on and off manual switching, and has an automatic opening on overloads or short circuits. Named the "Circuit



Master" it has a wiping and cleaning action of contacts whenever the handle is thrown on. An overload control latch is a straight member without offsets or bends: thus assuring correct ampere calibration and improved operation.

New Armor Cutter (514)

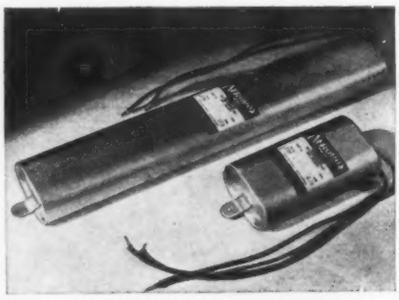
No more nicked wires, no more bending of cable, no more fussing and no more shorts, are advantages claimed for a new BX armor cutter announced by the Ideal Commutator Dresser Co. The tool is a handy pocket size and easy to use. Jaws are formed to take BX cable of any make. Cuts cleanly without injury to wire insulation and quickly along length of cable for opening into outlets switch



boxes, etc. Hardened steel cutting blade is removable for sharpening.

Capacitors (515)

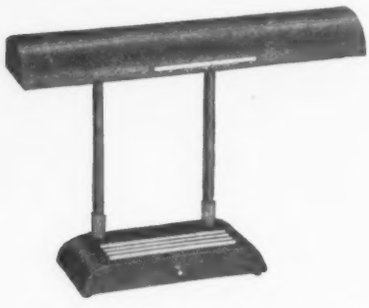
Capacitors designed specifically for fluorescent lamp power-factor correction are presented by Aerovux Corp. These capacitors may be included in the fixtures as initial built-in equipment, or may be added subsequently. They are of the oil-filled paper type,



The flat metal can is hermetically sealed. Insulated wire terminals are at one end, while mounting feet permit flat mounting.

Desk Lamp (516)

A new desk lamp has been presented by Van Dyke Industries with an adjustable shade for gauging light for deep or shallow desks. Standard finish is Morocco brown, with solid bronze penholders and ornaments. It



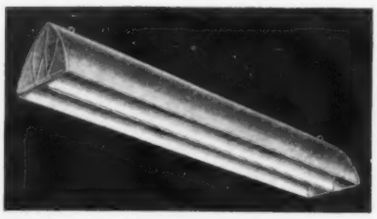
is supplied to take either a 15 or 20-watt tube. May be had in either a.c. or d.c.

Fuse Plugs (517)

New smart packages for its Royal crystal glass top fuse plug are now being used by the Royal Electric Co., Inc. Twenty of the handy 5-packs are packed in a master carton, which has an appealing illustration to attract attention.

Luminaries (518)

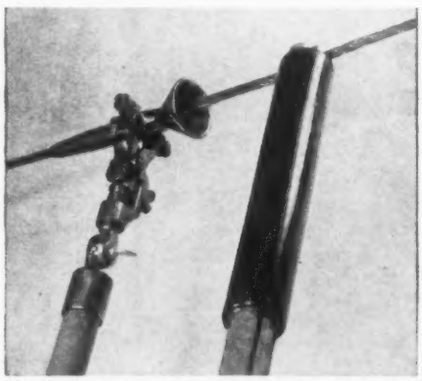
As a step in the development of a comprehensive line of carefully engineered flourescent lighting equipment, The Wiremold Co. have added an entirely new type of complete self-contained fluorescent luminaires. This new unit for two 40-watt fluorescent lamps embodies important advances in reflector design for more efficient distribution



of light in working areas, resulting in extremely high overall efficiencies. Exterior finish is aluminum.

Splice Tool (519)

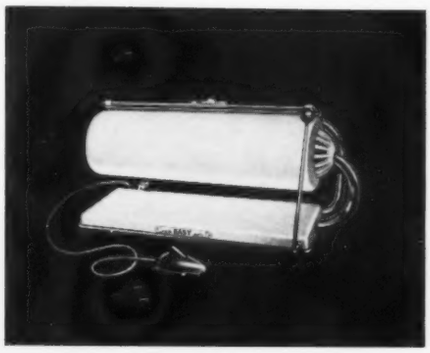
Tips universal splice tool, manufactured by A. B. Chance Co., greatly simplifies the job of making hot line splices. Mouth of the tool is opened by turning the pole. Automatic splice is then placed in position and clamped tight by closing the jaws with a clockwise turn of the pole. When the conductors to be spliced are pulled tight with rope blocks, insulated with link sticks, the loose ends are easily guided into the cone shaped mouth of the



splice tool by using a Tips-Grip-All clamp stick as illustrated. After splice is completed, the splice tool is released by turning the pole counter clockwise. One or both ends of the conductor may be attached to the automatic splice in this manner thus making it possible to do the job complete without interrupting service.

Portable Ironer (520)

Highlight of a new line of 1940 Easy Ironers is the Easy Porta-Matic, which weighs only 32 lb., has two ironing speeds and a three-way heat control. Its 1,200 shoe-element wattage gives it a 17% greater heat recovery ratio. Other features include hand or foot controlled roll stop for pressing, automatic cord rewind reel, fabric heat guide, Torque Tube pressure principle that gives uniform pressure over entire shoe area. It has a high ironing speed of 2,425 sq. in. per minute, and a carrying handle that makes transportation



easy and allows ironer to be hung on closet hook for storage.

Ground-Wire Bracket (521)

To provide a suitable ground-wire bracket for mounting on steel structures, the Ohio

Brass Co. has developed a device with a flat supporting piece, drilled with four holes to allow bolting to a steel tower, a fabricated steel pole or a bayonet extension. Using a clamp mounted on top of the device, this bracket, known as the Clamptop, permits an increase of spacing between ground wire and conductors of 6 in. or more over any other designs, assuming the same bolt holes are used. A design is also available for mounting on wood poles.

Thimble Clevis (522)

An open side thimble clevis is Hubbard and Co.'s answer to the problem of line threading. It entirely eliminates this major difficulty so often encountered by linemen and is designed to make injury to the conductor

practically impossible. This strong, lightweight clevis is intended for angles up to 60 deg. and the line may be tied-in on the pole or ground.

Contact Switch (523)

Today's tendency to simplify equipment is strikingly demonstrated in the new MK-39 high pressure contact switch, just introduced by the Delta-Star Electric Co. It is made in all voltages up to 161 kv. and current capacitors up to 2,000 amp. Cemented caps and pin insulators with tapped or slotted caps or station post units with tapped or slotted cap and base are furnished, as preferred.

At the Golden Gate Exposition

BRIEGEL METHOD...

Used in the Netherlands East Indies Building

"We used BRIEGEL box connectors and couplings for the lighting and fire alarm systems in the Netherlands East Indies Building," states S. Cimino of the Severin Electric Company, San Francisco. "Also for the fire alarm systems in 95% of the buildings and palaces at the GOLDEN GATE EXPOSITION.

"For economy, time-saving and appearance, we always use BRIEGEL connectors and couplings. You simply slip the fitting over the tube, press the BRIEGEL Indenter twice—and the operation is completed."

TELESCOPE BM SYSTEM

The One Tool Needed Costs Only $1.35

The B-M Connectors and Couplings and patented B-M Indenter are all you need for quick, quality work—and MORE PROFIT on EVERY JOB!

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CAPACITORS FOR EVERY INDUSTRIAL NEED

WELL DESIGNED - - - CAREFULLY BUILT - - - RIGIDLY TESTED

REDUCED LINE LOSSES - - BETTER VOLTAGE REGULATION - - SMALLER POWER BILL

FAST CAPACITORS

**for IMPROVED VOLTAGE REGULATION—
HIGHER POWER FACTOR—INCREASED REVENUE
CAPACITORS FOR EVERY INDUSTRIAL NEED**

WELL DESIGNED

OUR REPRESENTATIVE CAN SHOW YOU HOW TO SAVE DOLLARS BY INSTALLING FAST CAPACITORS

Based on our 21 years experience exclusively in the manufacture of capacitors.

CAREFULLY BUILT

Good material and the most advanced practice for greatest reliability.

RIGIDLY TESTED

Insulation resistance and power factor tests. Each unit must pass 8 tests.

QUALITY AT EVERY STEP

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CAPACITORS BACKED BY LONG EXPERIENCE

MICHIGAN UTILITY *Joins the SWING...*

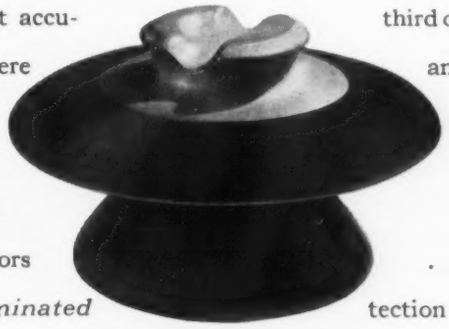
R-I-P PORCELAIN APPROVED BY THE INDUSTRY

GUARANTEED!

R-I-P (Radio-Interference-Proof) Porcelain is a special metallic oxide glaze, developed and patented by Westinghouse which, in normal firing, becomes an integral part of the insulator. It eliminates radio interference at the insulator — a function guaranteed by the manufacturer.

R-I-P PORCELAIN ENDS RADIO INTERFERENCE CAUSED BY DUST AND SOOT

Beset by complaints of radio interference from radio listeners adjacent to a 24 kv line paralleling a railroad, a prominent Michigan utility discovered that soot and dust accumulations on the insulators were responsible. They turned to R-I-P Porcelain for relief . . . equipped the line with Westinghouse R-I-P insulators . . . and *immediately eliminated this nuisance!* This is but a single instance of the outstanding success dozens of progressive utilities have experienced with Westinghouse R-I-P Porcelain. In one short year operating companies, with capacities aggregating one-third of the U.S. total, have approved and installed R-I-P Porcelain. Standardize today on R-I-P Porcelain for your replacements and for all new lines . . . and assure complete protection against radio interference. Two modern plants — in Derry, Pa. and Emeryville, Calif. — will supply your needs.



WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA., DEPT. 7-N.

J-05103

Westinghouse Porcelain

W WESTINGHOUSE ELECTRIC

ACCURACY
FOR WATTHOUR METERING

To 200% Normal Current

TYPE FW Metering Transformer Ratings—200/5 and 600/5 amperes to 1000 volts—Through type for easy wiring with secondary block. Can be used on higher voltage with insulated cable. Ratio may be changed by looping the primary. By reversing one primary lead, it can be made to serve as a 3-wire unit.

FW—A UNIVERSAL TRANSFORMER

METERS UP TO 1200 AMPERES USING ONLY TWO UNITS

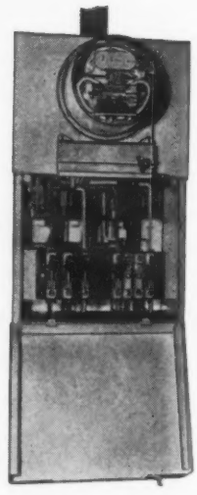
This capacity is possible because of the FW's high accuracy on overcurrents. Both 200 and 600 ampere ratings give good metering accuracy from 10% to 200% rating. Wide-range accuracy and small size of the FW result from the use of exclusive Hipernik core in place of silicon steel. Variety of transformers of intermediate rating formerly required can be reduced, eliminating unnecessary stock cost and maintenance.

Small, lightweight for meterboard mounting—any position

Exceptionally neat, self-contained meter units are possible with FW's. Transformers can be mounted in the meter box; meter socket or meter mounted on box cover.

Low first cost . . . Easy installation

Still further savings are realized in the low first cost and in ease and simplicity of installation on meter boxes where space is at a premium. Ask any Westinghouse office for information on these high-accuracy, high-current metering transformers. J-70246



This neat meter box arrangement is made possible by FW's compact through-type design.

Westinghouse Transformers

From the "Gasoline Buggy" to the Modern Automobile

From "Makeshift" Hardware to "DRIVEPOINT"* Bolts

The first automobiles were former horse-drawn buggies with a gasoline engine. What a far cry from the modern auto of today, designed around the gasoline engine.

In the same way, bolts used for pole lines have formerly been bolts "borrowed" from other duties — bolts designed for other purposes. Now, however, you can secure "DRIVEPOINT" bolts, designed and adapted specifically for pole line use; designed to provide maximum safety for linemen who can easily install and thread these bolts while wearing gloves at the top of a forty foot pole.

The "DRIVEPOINT" bolt's tapered point makes it easier to "find" the hole and drive the bolt in. It simplifies starting the nut, guiding it into place without lost motion. Linemen wearing gloves find nuts easy to start, regardless of the most difficult working conditions. No wonder linemen everywhere are asking for more "DRIVEPOINT" bolts!

Salvage value is higher, too. The tapered point permits workmen to hammer the bolt out of its hole without fear of smashing bolt threads. Thus re-threading and re-galvanizing expense is eliminated.

"DRIVEPOINT" bolts come in all sizes. The full thread double arming bolt with "DRIVEPOINT" ends provides additional flexibility.

For lower installation costs, reduced maintenance expense, and more satisfied linemen—specify "DRIVEPOINT" bolts.

It's EASY to START the nut on a "DRIVEPOINT"* Bolt with gloves under difficult working conditions

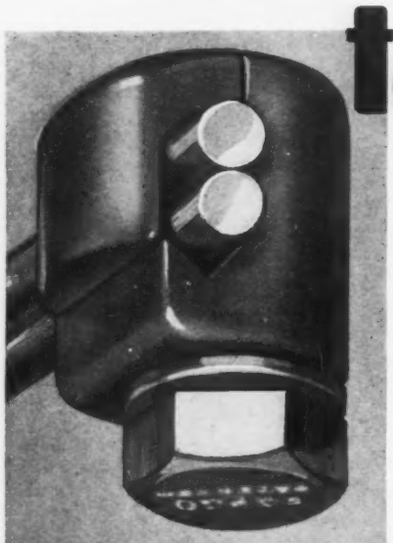
*PATENT APPLIED FOR

Hubbard and COMPANY

OAKLAND, CAL. PITTSBURGH CHICAGO

"HANG THE LOAD ON HUBBARD HARDWARE"

for streamlined tap-offs



FARGO "6000" CONNECTORS

A streamliner in looks and action, that's this new Fargo "6000" Connector. Just hook it on the run-wire, insert the tap, tighten the bolt... and your conductors are gripped in perfect, permanent contact. Built as one unit with no parts to lose, the Fargo "6000" is simply, safely, swiftly handled. Fargo rugged construction, Fargo minimum friction between operating parts mean extra years of repeat use. Now available in No. 6 & No. 4 sizes, with other sizes available later.

MADE BY FARGO MFG. CO.
DISTRIBUTED BY
LINE MATERIAL CO.

POWER To Bend It EASIER and FASTER

The Greenlee Hydraulic Bender shown above is made in two sizes for conduit from 1¼ to 3-inch and from 3 to 4½-inch.

The man on the job will like the Greenlee Hydraulic Bender because he can easily develop the hydraulic pressure needed to bend the pipe, by simply pumping the handle. And you'll like the Greenlee because it will save you money, both on labor and material costs.

You'll save money on labor costs because the operator can do the job much easier and faster with the Greenlee, and you'll also eliminate the cost of many manufactured bends and fittings. Yes, you'll agree along with hundreds of other users in the country that the Greenlee will more than pay for itself on the first few jobs.

Write for Complete Details.

GREENLEE TOOL CO. 1703 Columbia Ave. Rockford, Ill.

PRODUCT DATA

Keep Posted for 1c

Your being right up-to-the-minute may have an important bearing on your success. New developments are appearing daily in your field—tools to help you do a better job. Are you abreast of them? You fall back a step when the other fellow is well informed about a subject of which you are ignorant. Manufacturers' publications are a quick, efficient way for you to keep posted on current events in your field.

Isn't it a bargain to invest 1c (the cost of a postcard) to help earning power to which you look forward? American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to enjoy this service for your own. Check and mail the coupon below. That's all you have to do to help yourself toward better performance and greater rewards.

Lift Trucks (524)

Materials handling equipment is presented pictorially in a new catalog by Lewis-Shepard Sales Corp. Units from lift trucks to large wagon trucks are included in this 56-page publication. Specification tables are given in conjunction with most equipment.

Fluorescent Fixtures (525)

Fluorescent lamp fixtures, manufactured by Overbagh & Ayres Mfg. Co., are presented in a 16-page bulletin. Description of OAMCO fixtures for general lighting, show case reflectors and wiring fittings, and other miscellaneous equipment is given.

Switchgear (526)

A two-color, 16-page booklet on metal-enclosed switchgear has just been published by Westinghouse. Indoor metal-clad, indoor and outdoor or oil-filled metal-clad, horizontal draw-out truck and cubicle type switchgear are shown in many illustrations. Standards covering design and manufacture, adopted by the National Assn. of Electrical Mfgrs. for metal-enclosed switchgear, are listed in the last five pages.

Water Heater Sales (527)

Crammed full of down-to-earth, brass-tack sales ammunition is the booklet The Modern Kitchen Bureau has prepared as a summary of letters entered in last year's contest for retail salesmen—on the subject of electric water heater sales. Here are actual methods used by actual salesmen—how to locate and approach prospects; how to open the interview; closing arguments; and use of salesmaking material.

JUST OUT!

NEW G-E WATER HEATER SALES PRESENTATION BOOK

Nothing else like it! Done in the new pictorial style. Tells and sells in an interesting and effective way. Get a sample copy *today*.

. . . PLENTY OF SALES AMMUNITION FOR YOU

General Electric *writes* in *pictures* the powerful new selling story of G-E Water Heaters! Here's the way to talk to water heater prospects and sign 'em up. . . . Simply leaf through the new G-E Sales Presentation Book and watch interest lead to desire and action! It's a winner for stimulating water heater sales.

JUST ONE OF MANY NEW G-E WAYS TO MORE WATER HEATER BUSINESS

Ask your G-E Distributor to show you *all* of General Electric's new sales "props" and plans to get more water heater business this year . . . . See the sensational new sales film "We Like It Hot"—see the new "pictograph" Sales Manual—see the new Wall Display Chart and Visualizer—see the new G-E Heater-Meter. All yours for more sales! Get the complete story *now*.

General Electric Appliance & Mdse. Dept., Bridgeport, Conn.

- The General Electric Water Heater line is *complete*. Sizes for every need—from 2 to 140 gal. capacity. Rectangular, round, table-top, wall-type models. Monel or galvanized. Single or twin units. (Popular-priced "Rocket" pin-up model illustrated).

All G-E Water Heaters have the famous CALROD *immersion-type* heating units. Calrod heats water by direct contact, cheapest electrical method known. Durable; will not scale or rust.

GENERAL ELECTRIC

Graphic Wattmeter (527)

What you can do with a graphic wattmeter is shown in a recent issue of The Graphic, published by the Esterline-Angus Co., Inc. This four-page bulletin is supplemented with a booklet describing five types of graphic wattmeters. Diagrams of connection, notes on the use of wattmeters, and much useful information on the application of wattmeters are published for the first time.

Quick Selector (528)

A new 64-page enlarged (April, 1940) edition of the "Quick Selector" catalog is offered by Westinghouse. This catalog is prepared especially to facilitate the user of electrical equipment in selecting correct apparatus for any motor, lighting or feeder circuit. Four pages of general application data contain NEC recommended installation practices, simplified and tabulated for easy reference.

Valves-Controllers (532)

For the dairy, flow-diversion valves and milk-flow thermal-limit controllers are described in a new bulletin published by The Bristol Co. These controllers are designed to operate automatically a milk-flow diversion valve, or to stop the milk pump on high-temperature short-time and vat-holding pasteurizing systems when the milk drops to a sub-legal temperature.

IT HAPPENS EVERY DAY
ON SHIPMENTS FROM THE EAST
Shipments from the East leave daily for the West via NATIONAL fast, regular, dependable through service . . . combining truck and rail under one responsibility from source to your door.
NATIONAL
CARLOADING CORPORATION
Pull Wings on
FAST FREIGHT
OFFICES IN PRINCIPAL CITIES

Dieck Tools (529)

A 24-page catalog has been presented by the Bodendieck Tool Co., featuring Dieck tools for electrical live line maintenance. Each piece of equipment is illustrated and described completely. This particular company maintains a reconditioning department which repairs hot line tools.

Spools-Clevises (530)

"O-B Spools and Insulated Clevis Assemblies" is the title of a booklet just issued by the Ohio Brass Co. It describes, illustrates and gives complete information on three sizes of spools, including one for standard secondary rack use, and four types of insulated clevis assemblies using these spools. Four drawings show typical applications of both spools and assemblies.

Wire Rope Clip (531)

An attractive folder just off the presses fully describes a new wire rope clip now manufactured by the Thomas Laughlin Co. Tests of this clip indicate a 20 to 30% increase in holding power and a marked lessening of rope distortion. Results are attributed to bolts and identical bearing surfaces on opposite sides which equalize pressure on the rope.

Hospital Signals (533)

New developments in hospital signal systems, made during the past year by Connecticut Telephone & Electric Corp. are described and illustrated in a new 72-page catalog just released. It covers the complete range of systems and equipment of the company's hospital division, including nurses' call, Connectacall (patient - and - nurse communication), psychopathic hospital signalling, night lights, and interior and nurses' home telephone systems.

Meter Apparatus (534)

Apparatus for mounting, testing, calibrating and disconnecting meters, relays and instruments are included in Catalog No. 40 issued by Superior Switchboard & Devices Co. This 160-page publication is handily indexed and serves as an easy reference book on this particular type of equipment.

Metal Spray Gun (535)

A low-cost metal spray gun has been developed by the Master Metal Spray, Inc., and this unit is ably described in a four-page bulletin which shows its easy operation, its time and money-saving features. These are listed in detail.

SAVE TIME! USE THIS COUPON

To keep posted, simply circle the items in which you are interested, cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538		

Name ..... Title* .....

Company* .....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Capacitors (536)

Capacitors developed for industrial and electric utility applications are outlined in a 20-page catalog issued by the John E. Fast Co. Units presented in this publication are intended primarily for power factor correction. A separate catalog describes capacitors for other applications.

Delta-Star Switch (537)

The new MK-39 Switch recently presented by the Delta-Star Electric Co. is fully described in an eight-page bulletin, which illustrates the switch in action on various installations. General information is given together with diagrams and actual dimensions.

Pole-top Switches (538)

Pole-top switches for rural and distribution lines are discussed in an eight-page bulletin offered by Pacific Electric Mfg. Corp. Various features and advantages are fully outlined and described in text and pictures. Specifications are included in the concluding pages which show easy operating and manual control mechanisms.

"ALLIES"

IN NORTHERN CALIFORNIA

GraybaR
ELECTRIC COMPANY
Hotpoint

Best-Known Names In Industry Join Forces!!
Hotpoint Dealers "Cash In" on Graybar Service

Hotpoint announces the appointment of Graybar Electric Company as distributor for Northern California and Nevada. The association of these two companies will bring new benefits to those handling Hotpoint appliances.

- Quicker and more frequent deliveries from the many Graybar warehouses in this area.
- Increased consumer acceptance—added to Hotpoint's enviable record for performance and economy, is Graybar's 71-year-old reputation for quality products.
- Active Hotpoint sales promotion by both companies.
- Greater convenience—Graybar's distribution facilities are keyed to give the dealer greatest ease in ordering and delivery.

Call your nearest Graybar office TODAY, for full information. Attractive Hotpoint displays in San Francisco, Oakland, and Sacramento sales offices.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 West Taylor Street, Chicago, Illinois

GRAYBAR ELECTRIC COMPANY
Graybar Building, New York

The CHANCE ROCK ANCHOR does the job alone

There is no need for carrying lead and heating equipment or concrete mixing materials on the job when you use Chance Rock Anchors for anchoring in solid rock. The only equipment necessary is a rock drill. To install the anchor—drill a hole, drop the anchor into the hole and expand it by turning the rod. The large tripleye admits a bar for use as a wrench. The expanding action wedges the anchor into the hole, and the pull on the rod increases this wedging. Ask the Chance man or your jobbers salesman for a demonstration.

A·B·CHANCE CO. ABC INDUSTRIES CENTRALIA MISSOURI

NEW BOOKS

INDUSTRIAL DESIGN by Harold Van Doren, published by McGraw-Hill, $4.50, available at McGraw-Hill book rooms, 68 Post St., San Francisco. This is the work book for one thinking about entering this new profession as well as a systematic background for both the beginner and the business executive desiring a knowledge of what industrial designing is all about. To electrical men, Van Doren's background will be sympathetic. He is one of the nation's leading industrial designers and last year he attracted notice at the New York World's Fair by walking off with commissions to "do" the 1940 models of such electrical appliances as Westinghouse range, Maytag washing machine and Philco refrigerator.

TELEVISION by V. K. Zworykin and G. A. Morton, published by John Wiley and Sons, $6.00. Despite the authors' admission that they were forced to omit a great deal which is both interesting and important, this book's 646 pages do an amazing job of covering the field. The authors are both identified with the Electronic Research Laboratory of RCA and have drawn upon information available elsewhere in that group. Their endeavor has been to present a volume which will enable one to survey the entire field in one book, and at the same time present a wealth of fundamental data. The first part deals with physical principles, the second with the field in general and the third with component elements of an electronic television system. A fourth part sums up the work of the RCA-NBC television project and concludes with some comments on contemporary problems and the future.

ELECTRIC WIRING by W. F. Ibbetson, Sixth edition, published by E. and F. N. Spon, Ltd., London, (available in the United States through Chemical Publishing Co.), $2.50. The fundamentals of this book are good, but beyond that point its value is limited in America to those who for some reason may be interested in contemporary practices in England, since it is written in accordance with regulations and problems which influence wiring there.

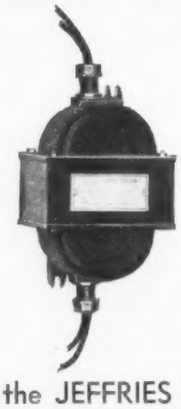
INTRODUCTION TO ELECTRICAL MACHINES by A. W. Hirst published by Blackie & Knorp, Ltd., London, (through Chemical Publishing Co. in the United States), $2.25. One of a series of comparatively small volumes, each dealing with a particular phase of electrical engineering. The treatment is mathematical and gives special attention to harmonic analysis. Covered are general methods of making magnetic calculations, estimation of leakage coefficient and leakage reactance, types of magneto motive force waves produced by polyphase windings.

PRACTICAL ELECTRICITY by Terrell Croft, 4th edition revised by George H. Hall, published by McGraw-Hill, $3.00, available at McGraw-Hill book rooms, 68 Post St., San Francisco. Practical Electricity was last published in 1932. Its principal object was to present the whole field of electricity in a way that could easily be understood by anyone, even though equipped with little mathematical training. At the same time, it was designed to equip the university graduate wih a means of reconsructing his concept of electricity and magnetism in line with the most recent developments. The fourth edition carries on this purpose and makes the greatest changes in sections dealing with electronic tubes, which have been developed so extensively in the last few years.

"PRACTICAL ELECTRICAL WIRING, RESIDENTIAL, FARM AND INDUSTRIAL," by H. P. Richter, McGraw-Hill Book Co., $3.00, available at 68 Post Street, San Francisco. Simple enough for the beginner, yet complete enough to be of value to the practical electrician, this book seeks to teach both the way things are done and why. Aiming only to cover a scope of work with voltages under 600, the book contains three parts: Part I is fundamental, terminology, principles and theory. Part II actual wiring of residences and farms. Part III, wiring of stores, factories, schools and similar structures. While adhering to the National Electrical Code, it makes no attempt to be as complete. It is profusely illustrated to show by picture wherever possible the matter covered in the text.

ELECTRIC DISTRIBUTION FUNDAMENTALS by Frank Sanford, published by McGraw-Hill, $2.50, available at McGraw-Hill book rooms, 68 Post St., San Francisco. Many men on the job will welcome this book. Recognizing that many engineering papers are directed primarily at engineers and supervisors, the author has written this one for foremen, linemen, electricians, troublemen, repairmen, inspectors. Sanford is distribution engineer for Cincinnati Gas and Electric Company. He has approached his subject with the idea of setting forth as part of the general system of electric supply. In going into detail on various problems, he makes extensive use of graphical methods, avoiding formulas based on calculus. Many of the problems do, however, require a working knowledge of voltage drop, wire size calculation, transformer connections, inductive reactance, power factor, etc.

ALL KINDS of SMALL **TRANSFORMERS**



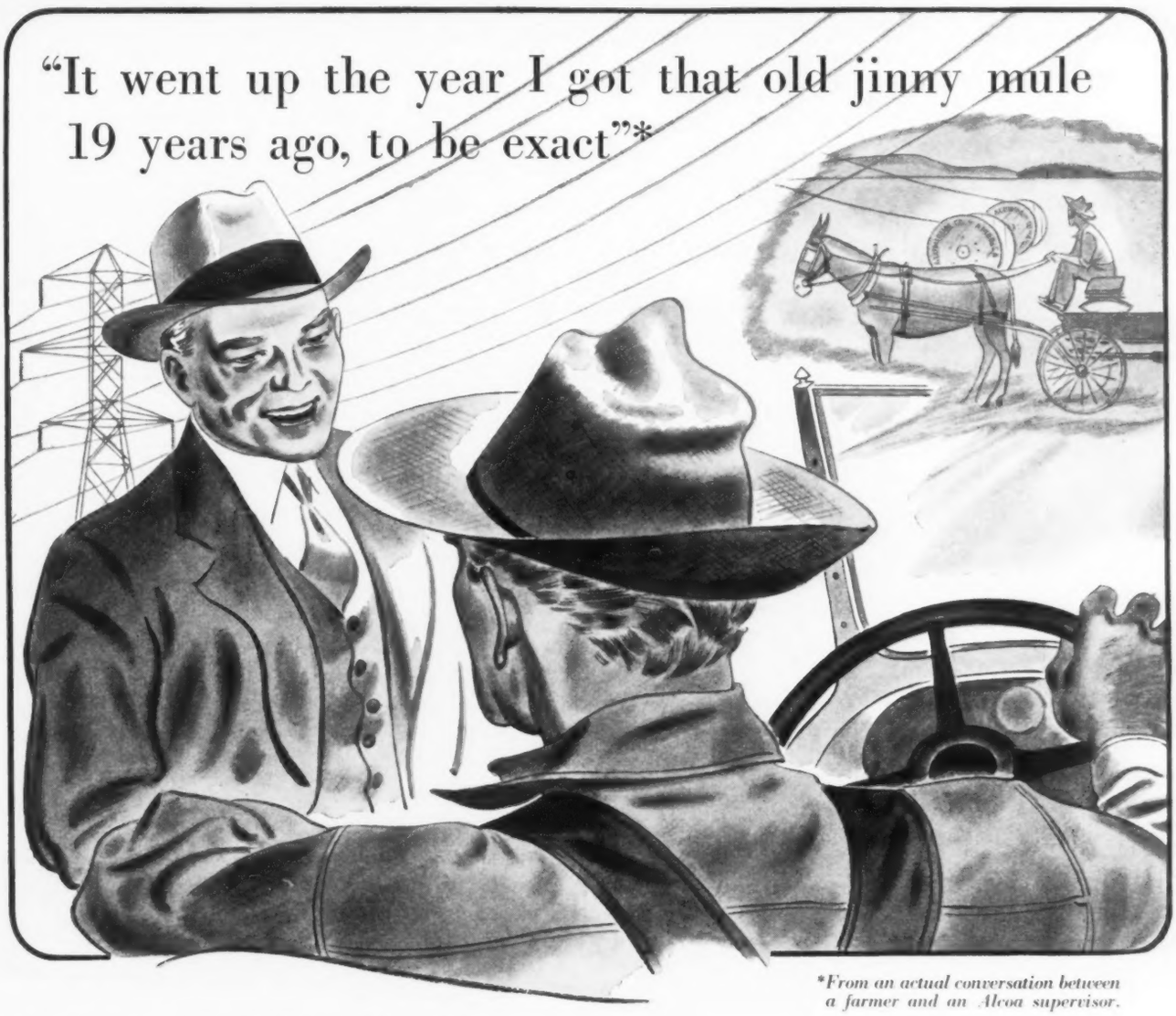
—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformers to **exactly** match your requirements. If not in our regular line, we build to meet your specifications—in a hurry!!

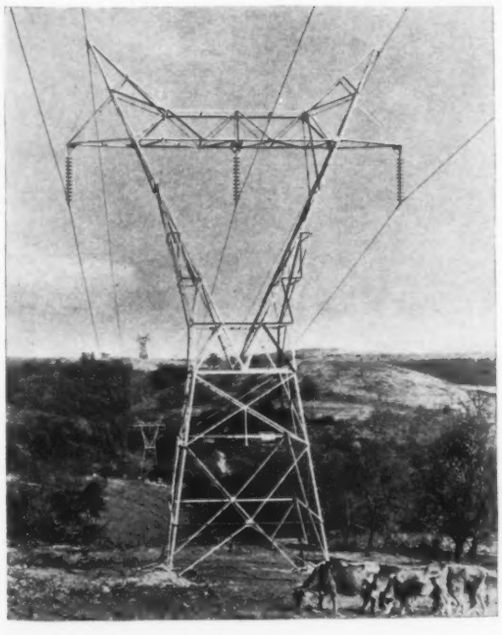
Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY
5706 Long Beach Ave. Los Angeles, Calif.

"It went up the year I got that old jinny mule 19 years ago, to be exact"*



*From an actual conversation between a farmer and an Alcoa supervisor.



"That Aluminum line was built in 1921. I remember—"

Many men, like our rural friend, feel a kinship for the "Aluminum" power lines they've grown up with. They boast how "she rode through the winter of the big blizzard." Or recall seasons of exceptionally high winds, excessive heat and cold. These lines earned this respect by staying on the job, year after year, against serious odds.

Men with the power companies have like respect for A.C.S.R. lines. They know that the ability of these conductors to stay on the job means money in their pockets; maintenance costs are low, emergency calls few and far between. That's why, when they're building a new rural or hi-line, they specify A.C.S.R. Their construction follows A.C.S.R. engineering standards.

ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pennsylvania.

A·C·S·R

Aluminum Cable Steel Reinforced

FOR RURAL LINES AND POWER TRANSMISSION

ELECTRA'S HUSBAND

"Miniature County Fairs"

THE other day I was visiting with the *maitre* of one of our important hotels which for a few days, was crowded with the delegates and exhibits of an unusually large convention. Every public room was occupied by some meeting or display, the regular guests were being pushed around, the lobby was littered with "literature" and the *maitre* was sore at heart.

"Conventions aren't what they used to be," he opined, "but the Chamber of Commerce makes us take them. Before the depression a convention was a great event and important men used to attend. Now they send the second string—department heads and secretaries—and if a big man is on the program, he stays just long enough to make his speech and then beats it."

At the time I had been reading "Bonanza Inn" and my mind was awhirl with anecdotes of the first Palace Hotel and the kind of entertainment it offered; so I had a feeling of deep sympathy for this *maitre*, who was of the old school. He remembers when people used to dine. Now they sit on stools in the coffee shop. He remembers when a hotel was a center of social activity—now it frequently looks like a miniature county fair where "space" is sold to exhibit everything from automobiles to tombstones.

Well, one thought led to another and pretty soon I was asking myself some questions about our own electrical conventions and wondering if, in similar circumstances, this *maitre* would have the same opinion of us as he seemed to have of the general run of 1940 convention delegates. Unless we rate higher than they do, we are missing something in our annual gatherings.

Take the matter of top men, for instance. Some of the executives who approve the expense accounts may not like this, but it is a fact that they don't attend conventions like they used to. Certainly they are generous in their support so far as sending delegates is concerned, but the meetings would have a lot more "oomph" if a few presidents and high-ranking vice-presidents were there from start to finish. I remember when I was a cub in this business what a thrill it was just to be in the same room with such men as Britton, Creed, Wishon, Maddox, Ballard and Coleman. They went to all the meetings. They took part in the free-for-all discussions and when they talked, everybody listened. They played golf, they were at the banquet and they danced with all the pretty girls in sight.

Now, as the *maitre* says, if they come at all, it is only long enough to make a speech and they beat it. They don't even wait for the night train—they fly home!

There is something about a good convention which is hard to define. For two or three days men and women from faraway places are brought together under one roof where they can talk, discuss and argue. They get the views of men who are guiding industry. They meet young fellows, coming along with young ideas. Fifteen or twenty men crowd into somebody's bedroom, talk nonsense for an hour, make a few sensible comments about a current problem and emerge with ideas which will be useful when they get back to their desks. At luncheon they listen to a speech by Mr. Big which they promptly forget; then later, in a small informal group, some of them gather around the same man and absorb every word he utters. When it is all over, nobody can make a score sheet of what has happened, yet everybody has benefited.

A good convention is something like that. A poor one is just a lot of fellows standing around dropping ashes on the rugs.

* * *

WHILE I am in this contemplative mood, let me ask, "What has happened to leisure?" Electra and I have all the well-known devices for saving time and energy, including Fibber McGee's wax on the kitchen linoleum. We have a woman who "comes in," we have a boy to work in the garden and I'm on a five-day week—and yet we never seem to have time to do the things we want to do. The answer to that, if we can find it, may explain why executives can't find time to attend conventions.

* * *

"DOG gone it!" I sputtered, throwing the paper on the floor and reaching for a Camel.

"What's the matter now?" Electra inquired, looking up from "How Green Was My Valley."

"Oh, it's these half-baked scientists who are constantly breaking into the papers with some scatterbrained idea! Listen to this—right on the front page. Dr. Whosis of Yalard University has been observing the sunspots. That's O. K. Science is curious about sunspots and hope someday to find out more about them . . ."

"I read something about how they interrupted radio last week. Do you think that is possible?" Electra asked.

"Sure, it's possible. We know something happened. Radio was affected—so was telegraph service. And Hell Gate station had a dip of 1,500 volts which hasn't been explained. There's a lot about electricity that still mystifies mankind. And it ill behooves any of us to be cocksure about what we know or don't know. Scientists who used to laugh at Father Ricard and his sunspot theory are now echoing some of the things he said at Santa Clara."

"Then, what's eating you?" Electra evidently wanted to read her book.

"What riles me," I replied "is the way some man with the prestige of a degree and a position on some faculty will concoct a story simply to get his name in the paper. This guy succeeded—in a big way. And what was his story? 'Don't be surprised if your next light bill is a few cents higher. The sunspots have been at work!

"But they might have spun the meter a tiny bit," Electra interposed.

"Maybe. Maybe not. I don't know. The guy from Yalard doesn't know. Nobody knows. All anybody knows is that something happened and the thing to do in such case is to investigate the evidence and consult fellow scientists—but not to bust into the papers with a story like that. It's the cheapest kind of movie publicity—like timing a divorce to break just before the latest picture has its premiere.

"And, furthermore, Madam, what gets my eternal goat is the fact that this yarn was sent all over the country and thousands of tired, patient counter clerks next month will be forced to listen to folks kicking about their bills and contending that the power company ought to knock off something on account of the sunspots. Probably this prof thinks he has made himself famous. Well, he hasn't. I read the damned story three times and I don't even remember his name!"

She's the "CATCH" of the Season!

Dainty Westinghouse Bride! She is catching the public fancy clear across the country—attracting throngs of interested prospects, shoppers, buyers into more than 5,000 Westinghouse dealer stores.

Big stores, furniture stores, public utility departments, hardware and electrical stores are featuring the Westinghouse "Advise-a-Bride" Contests—and everywhere the story is the same, "Things are humming!"

Every Westinghouse retail promotional activity is aimed at *ACTION* in retail electrical stores because this action brings not only appliance sales but helps all the goods the stores are selling.

Your Westinghouse man knows what is going on—and it will pay you to ask him about the forthcoming Westinghouse retail promotions.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.
MERCHANDISING DIVISION, DEPT. 162, MANSFIELD, OHIO

Tune in on "Musical Americana"—every Thursday evening
NBC Blue Network—coast-to-coast

QUOTES" FROM A SALESMAN'S NOTES

1
Four stores in my territory have actually dressed up girls like Brides to hand out entry blanks
2
Everywhere I go the Bride Displays are in front windows – Getting lots of attention – Bringing in the shoppers
She certainly pulls 'em in!
Help me with your advice!
FREE!
3
– tuned in "Musical Americana" last night – swell program and a good play for the Bride contest – Everybody is hearing about it.
SO JUST GO TO YOUR NEAREST WESTINGHOUSE APPLIANCE RETAILER AND GET YOUR FREE OFFICIAL ENTRY BLANK—LOOK FOR THE BRIDE WINDOW DISPLAY
4
– big stores, little stores – all outlets are sizzling with activity! – and our new dealers are delighted
Boy! they're getting ACTION - plenty!

Westinghouse "The Line of Least Resistance"

Memo —TO POWER SALESMEN:

THIS is one of a series of G-E advertisements appearing currently in several industrial trade journals to tell plant operating men of the many advantages of G-E midget metal-clad switchgear, which is now available at a considerable reduction in price. We know you will be interested because of your concern in seeing that your customers have the best possible protection for their incoming lines, power feeders, and motor circuits. Our switchgear specialists will be glad to assist you in bringing to your customers' plants the advantages of this high-quality equipment.

Now you can **PLAY SAFE** *at* **LOW COST**

Protect Even Your Light-duty Circuits with G-E Metal-clad Switchgear

G-E TYPE MI-9
METAL-CLAD SWITCHGEAR

DRASTIC PRICE REDUCTION

on G-E Midget Metal-clad Switchgear

BASED ON ANTICIPATED DEMAND

NOW you can give circuits up to 5000 volts the same dependable protection used for higher-voltage, high-capacity circuits—and at lower costs than ever before. Recent price reductions on G-E Type MI-9 metal-clad switchgear make available to every industrial plant and public building the economy, safety, and convenience obtainable only with G-E vertical-lift metal-clad.

We have made this price reduction because we are certain that there is a wide need for this equipment in all classes of industry. The new low prices are based on anticipated quantity production of standard units. We are confident that increased sales volume will justify this price reduction.

How About YOUR Plant?

Are you sure of the protection on your incoming lines, power feeders, and motor circuits? Or are you gambling that obsolete, inadequate equipment will get by?

Are you sure that your operators are not taking chances—on the safety of both personnel and equipment—by depending on switchgear that has not kept pace with the growing needs of industry? Many such situations are being corrected by the installation of vertical-lift, metal-clad switchgear.

Completely Factory-assembled

Wide field service and actual operating experience in industry have proved G-E Type MI-9 metal-clad switchgear to be the ideal equipment for service up to 5000 volts, 50,000 kva interrupting capacity. It consists of a completely fabricated, factory-assembled unit, containing circuit breaker, insulated buses and connections, disconnecting devices, sturdy mechanical interlocks, and instrument transformers where required—delivered as a unit ready to put into service, with low (predictable) installed cost.

Get the complete story of this modern shipped-assembled, metal-clad switchgear. Just call the nearest G-E office, or ask for a copy of our new descriptive bulletin, GEA-2249C.

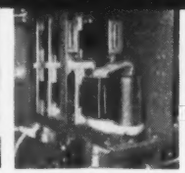
NINE FACTS THAT PROVE THE VALUE OF THE MI-9

Be Sure You Get All These Advantages

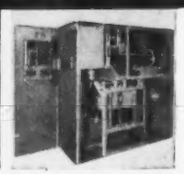
Include Them in Your Specifications

1. Completely Metal-enclosed— NO HAZARD TO PERSONNEL

2. Removable Breakers— EASY MAINTENANCE



3. Liberal Insulation— FOR SERVICE CONTINUITY

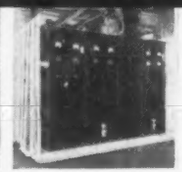


4. Co-ordinated Circuit Components— BALANCED DESIGN

5. Sturdy Mechanical Interlocks —SAFETY FOR OPERATORS

6. Self-contained Control— REDUCED STATION COST

7. Not a Bunch of Boxes— A COMPLETE JOB



8. Shipped Assembled— LOW INSTALLATION COST

9. Choice of Colors— ATTRACTIVE APPEARANCE

Black
Light Bronze
Dark Bronze
Pearl Gray
Cream

HIGH-QUALITY SWITCHGEAR FOR THE LOW-PRICE FIELD

GENERAL ELECTRIC

854-3

Let the Isle Be Bright for '40

By Charles L. Huyck*

MANY a 1939 visitor to Treasure Island, as he swung around the Elephant Towers in the elephant train, thought that the glass cupola on the Administration Building looked like the control platform or "fighting top" of the Fair.

It certainly has been during these hectic weeks, when every department in that big building has been furiously busy with plans to lighten, brighten, energize, publicize, decorate, and renovate the Golden Gate International Exposition for its 1940 encore.

Outdoor illumination was the outstanding feature last year. A. F. Dickerson's creation of an incandescent island floating in blackest space gave us all a perfect and lasting memory of the Exposition, vivid long after its sex and sax impressions had faded from our minds.

Electrical outdoor illumination will again be the Fair's major feature in 1940, with many new applications of incandescent and fluorescent lamps, spots and floods. And once again Lighting will be the inseparable twin of Color, with George Garthorne, electrical chief, and Jess Stanton, color architect, working hand in hand toward another amazing night spectacle.

"Day and night, Treasure Island will present a completely new picture," declares Jess Stanton. "It will be set at a far higher key. The 1939 colors were pastel, but the 1940 colors will be bright—they will step out of the background."

"What are the new effects and how will electricity accomplish them?" This is the question we asked George Garthorne and here is the answer, in a rapid tour of the Fair, court by court.

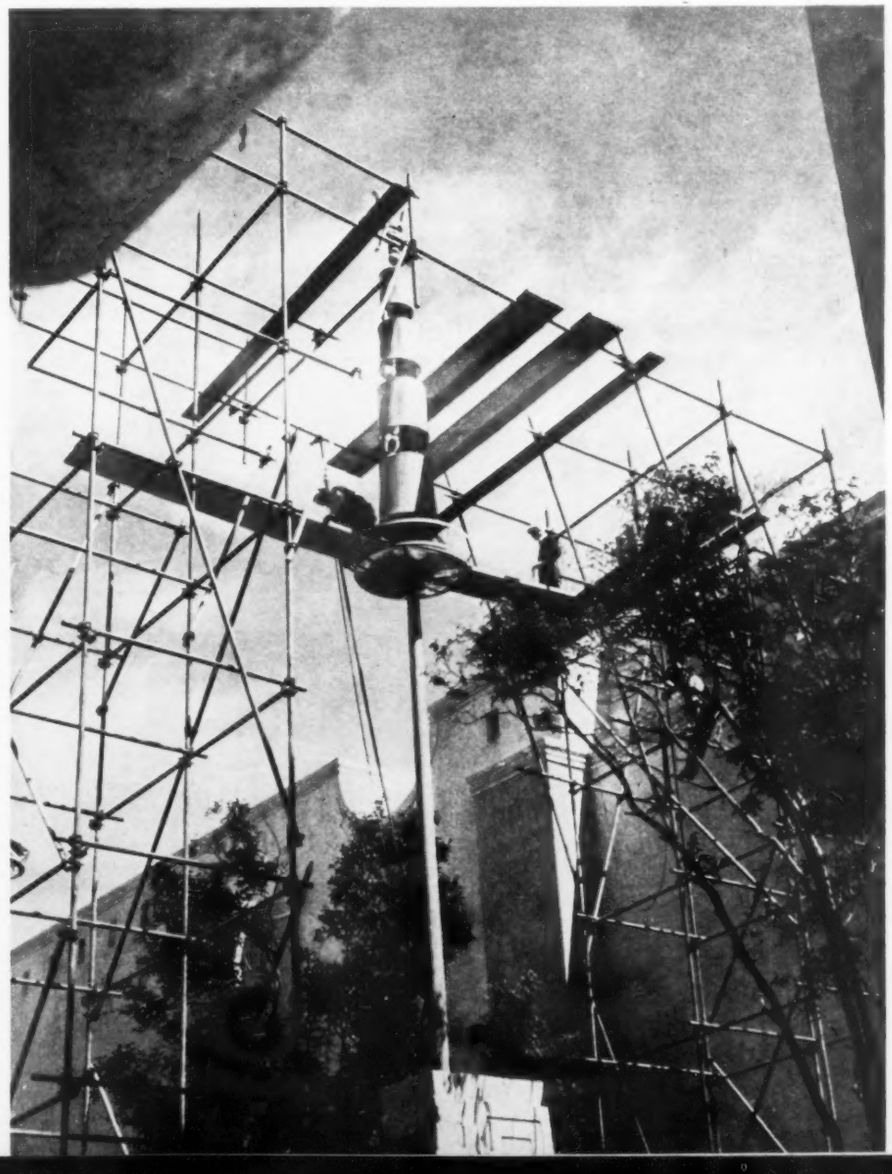
First, each big palm along the west seawall will be spotlighted by a crossfire from two 15-watt green fluorescent floods, sunk flush with the ground to conceal the light source. The tremendously long west wall, of a flattish and rather disappointing white last year, will be bathed in amber, The Elephant Towers, red last year, will be resplendent in "fruit juice" shades of apricot, orange, and lime green. Each of the four howdahs will sport 1,200 40-watt natural amber-orange lamp bulbs, the effect being that of a rain of molten metal.

The South Garden, at the end of the north-south axis, came rather late into public favor, but eventually was a Mecca for clicking Kodaks and will be even finer this year, especially at night. The lips of the big round pool will be repainted in light from green to a blue. Eight tall Chinese lanterns are being added in pairs. They will flank those four beautiful statues by Haig Patigain portraying the moods of our Mother Earth, and the floods spotting the statues will be countersunk. Also, the cast iron gooseneck pipes of the standards will be encased in bamboo, to maintain the natural effect of this Sunken Garden.

The Court of the Moon will be substantially unchanged in its perfect balance of lighting, color, water, planting, and ornately sculptured walls. The violet-blue-green segment of the spectrum is the color theme of this lovely Court, the favorite promenade of night visitors. A few more floods will be staring at the Lady with the Evening Star.

Central Court

The great central Court of Honor and its spectacular Tower to the Sun is the focus of the Fair. It will be a symphony in green and white with amber highlights. Recalling its ivory tower, masses of tumbling water, and thick clumps of shrubbery you will agree that green and white are just the right night colors. The glorious Tower —perhaps the most widely known ob-



* Graybar Electric Co., San Francisco.

ject in print, last year—will be pure white outside, dazzling though not of aching intensity, and amber inside. A total of 1,600 six-watt yellow bulbs on 15 in. centers will outline the roofs of the four flanking belvederes or pavilions, whose arcades will be lit with green fluorescent lamps and on whose roofs will be mounted the requisite searchlights to intensify the top tower lighting.

Court of the Seven Seas

The walls of this majestic 1,100 ft. court are diversified by niches, all to be repainted in gold. They will be it with amber and the wall facade itself in blue-green. These walls and others are being repainted in a special compound containing millions of tiny crystals, whose flash and sparkle gives an exhilaration to each large surface so treated. The contributing factors of this marine court—the doorway murals, the sculpture, the trireme prows along the roof ridge, the wall maps in travertine —will be picked out intelligently by various light sources, and those exceedingly attractive light standards in the form of caravel masts and tops will be brighter and fresher than ever. In fact every square yard of canvas or glass in every lighting fixture has been scrubbed with soap and water and its color renewed, every flagpole has been repainted, and every outdoor fixture, spot, or flood has been re-lamped, throughout the entire Exposition.

Court of the Pacific

This renovation is particularly noticeable in the Court of the Pacific, whose terrifically tall Siamese umbrella light standards, each as high as an eight story building, have been repainted from natural amber to lantern red against a yellow background. Colors have been eschewed for the big fountain with its fantastic statuary, but many white floods will gleam through its foam without glare. These floods have been ingeniously designed by George Garthorne, the ingredients of each being a Par 38 lamp listing at $1.40, a 90c pigtail socket, 25c of rubber cement and a few winds of tape, and 50c labor.

Court of Reflections

The wide shallow pools, so important a factor in the beautiful effects of this court, have been repainted in glyptal paint of midnight blue. No light filaments will show along their lips. The court color motive will be delicate shades of coral and the golden bather will be highlighted. Sixteen Chinese lanterns in pairs have been spaced along each side, alternating with trees.

Court of Flowers

Surprise pink tubes in brackets have been replaced by white lumiline lamps. The walls, alcoves, and arcades, formerly pink, have been repainted in deep apricot.

California State Group

This attractive section of the Fair, a sort of State mosaic pieced together of various County structures, was rather dark and therefore uninviting at night, and will be brightened in several ways. More lighting standards will be planted throughout the area, floods will be focused upon Alta California and Mission Trails particularly, the space north of the Auditorium will be stepped up in intensity, and 20 to 30 tall poles will fly floodlighted flags.

Pacific House

Within and without, because of its colorful Covarrubias murals, glass maps, Pacific Basin fountain, extensive parking area, and thoughtfully provided reading and writing space, Pacific House ranked as one of the wellnigh perfect things of the Fair. Perhaps it called for external color, and so its silver facade will be repainted; and the lagoon which washes its steps will be the setting for one of the most beautiful lighting changes of 1940. Groups of spots will be placed on every cape or peninsula around the lagoon, each containing a 100-watt mercury lamp, bathing the clumps of feathery trees and thick shrubbery in soft blue-green and shooting tall pencils of blue-green light over each "green cathedral." Contrasting Chinese lanterns will be dotted througout the area with a color change in each.

Gayway

The Gayway needed several kicks in its exhibitional trousers, and it is getting them. A giant sign "Gayway" in eight foot green Neon letters will be reared above the main entrance between two 50 ft. poles, in an arch 60 ft. wide and 40 ft. high. Each pole will be encased in a light cylinder four feet in diameter and twenty feet high. The light cylinder will consist of five vertical rows of 48 in. fluorescent tubes spaced on 7½ in. centers.

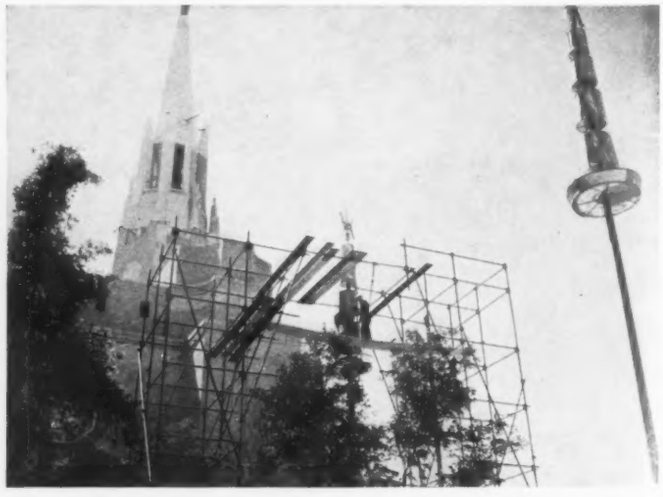
Similar but somewhat smaller signs with six foot letters will surmount the other entrances and across the roadway will loop strip after strip of the traditional bright lights—40-watt lamps on 15 in. centers, staggered with pennants to give motion and sparkle. There'll be bright lights everywhere—"nothing hidden, nothing concealed!" as the barkers used to say and truthfully at that —all filaments smacking you in the eye in a sort of Lighting Nude Ranch.

The Fixture Designer

A practical man to translate ideas into realities, visions into verities, is a treasure, even on Treasure Island. If he is artistic as well as practical, a designer as well as a master craftsman, he is vastly more valuable; and such a man seems to be Eugene de Ellas of California Chandelier Makers, San Francisco, who designed most of the fleet of lighting standards at the Fair.

So you see that things have been

Group of scintillators lie waiting to be placed in their location at base (in background) now under construction. Workman (right) gives a Siamese umbrella in Court of the Pacific a going-over



moving swiftly over at Treasure Island. We were all sorry when the lights faded last October; but while we were folding up and packing away our memories, a crew of workers were disassembling and storing the outdoor fixtures and fittings that would suffer during the winter. The big warehouses were miracles of neatness and system, under Ed Jenkins' charge; the quantity and variety of their contents rivaled the combined stocks of electrical, hardware, and plumbing wholesalers and as for system—even the oilskins worn by fountain cleaners had their section, like one of Neptune's cloakrooms.

Horticulture, ranked close to Lighting and Color by the public, will again be outstanding. The first color planting was 90% completed a month ago, and Elmer Gould, Director of Horticulture, will parallel the colors of electricity and paint with floral living hues.

All murals and statues have been rescrutinized, to bring out their beauties—or subtleties invisible to the man in the street (or court)—by additional spots or floods. The jazzstand has been carted away from the Temple Compound, so as to give an unobstructed view down that striking court axis.

The battery of scintillators has been moved from the north shore of Yerba Buena to Treasure Island itself, just back of the athletic field and terminating the second east-west axis through the Ferry Entrance and Court of the Pacific. This is a far more effective and inescapable location.

The scintillator battery is composed of 36-in. searchlights, consuming 400 kwh. in all. The maximum demand of the Fair last year rose from 12,800 kwh. on its opening day to an August peak of 13,900, and subsided gradually to 13,540 at the close. The Fair's total current consumption last year was 31 million kwh., of which it marketed over 40% to exhibitors and concessionaires. Its 1940 rates to them, by the way, will be 25% lower.

And here ends our preview of the G.G.I.E. for 1940. It has proceeded by a review of color-effects and the towers, walls, fountains, and decorations on which electricity will emblazon them. The Fair opens on May 25th, closes on September 29th, and will run 138 days for the delectation, information, and inspiration of an estimated seven million visitors.

Do you remember those balmy weekends in September and October when we really began to take the Fair to our hearts and regretted the months of lost opportunity? Let us recapture that mood of last Fall and make our 1940 Exposition a highlight of Western history. When its lights are dimmed, this time they will be gone forever.

Westinghouse and General Electric To Stage New Fair Features

MANY new wonders of electricity will result in the public debut of the new 1940 Westinghouse Exhibit at the Golden Gate International Exposition. Considerably changed and improved to keep pace with latest developments in electricity, the display will, however, retain certain of the 1939 exhibits.

According to Chas. A. Dostal, Pacific Coast district manager of Westinghouse Elec. & Mfg. Co., Willie Vocalito, the mechanical man, will again do his "stuff," this time accompanied by Sparko, the mechanical dog.

Signing the Westinghouse contract for 1940 space on Treasure Island are (left to right) Charles Dostal, Westinghouse; Marshall Dill, president, GGIE, and R. J. Holtermannn, vice-president, Westinghouse Electric Supply

Huge enlargements of magazine advertisements which have been animated, will high-spot features of Westinghouse appliances, while many new home appliances will be exhibited, placed in a number of Westinghouse model kitchens.

Another portion of the exhibit will the Westinghouse electro-static air cleaner which can remove 90% of impurities in the air. Nearby the "Mobilaire," a room air-conditioning unit, will be in actual operation.

The "playground of science," including the Stroboglow, Grid Glow Tube, the Breath Relay and the Spencer Discs have been redesigned. The "Cashier's Cage" will be a new display to intrigue the banker and business man.

Other features include an improved welding exhibit; a cutaway operating turbine, a "motor torture" chamber; latest developments in lamps; an actual operating model of Mount Palomar Telescope, and a replica of the famous Westinghouse Time Capsule, and many other exciting and interesting displays and attractions.

General Electric Plans

A "PHANTOM House" built of plate glass, heads the spectacular features listed for the new $250,000 General Electric Exhibit nearing completion for the 1940 version of the Golden Gate International Exposition.

Robert L. Smallman, manager of the G-E exhibit, lists the features General Electric has scheduled.

Beyond the "Phantom House," there will be on display the largest light in the world, 50,000 watts; a new production of the "House of Magic," with a half-hour scientific show; broadcasting under glass from a new "fish-bowl" studio at KGEI; an animated "light-conditioning" display; replica of Edison's laboratory; a "Magic Kitchen" which "talks and walks"; the "Tire-o-Scope," a device which X-rays automobile tires for hidden nails, glass, etc.

"There will be something doing every minute at the new GE exhibit, with two or more 'live-shows' running at all times," Smallman said. "We believe the 'Phantom House' will be an outstanding attraction. It will give people a chance to see what goes on behind the walls of their homes."

General Electric gets ready to handle more than 4,000,000 visitors to its exhibit, a figure it set last year at the GGEI on Treasure Island

Electric Kitchens Move Into Stores

Dealers in the Northwest find that kitchens are now packaged and can be sold as such

By W. A. Cyr

THERE is a surpassing, healthy trend toward electric kitchens—complete. More of them are being installed in stores and made the center of kitchen demonstrations and store cooking schools staged for the dealers by the home service girls of the local utility.

In western Washington were a number of instances. Jack Mulhern, appliance manager at Wahl's, Bellingham, has had an electric kitchen for two years now, refinishing it each year. This kitchen and a radio parlor adjacent to it bring store traffic downstairs to the appliance department. The kitchen is always ready to operate and is used by clubs of women to prepare refreshments when they come down to hold a card party or a meeting in the radio parlor. Listening to short talk about appliances is the only charge made for use of the place, but it does bring prospects.

Another idea used here is worth a thought. A special paper shopping bag is given to customers of upstairs departments in which to carry home their purchases. When they get home they find in the bag pieces of sales literature about the appliances.

Emil Hellenthall, of Everett, with a housewares store of distinctive character, planned an all electric kitchen for spring, located up near the front of the store. It will be made the stage for two annual promotions, in spring and fall.

Hellenthall sells a number of garbage disposal units each year and dishwasher sinks too. He always has one installed and operating so that customers may play with it. A woman once interested will bring in her friends. He sells many dishwashers to small eating houses, lunch rooms and the like. Caution was voiced by Mr. Hellenthall to be sure that the customer has a 3-in. waste pipe and a fall or drop that is adequate before installing a garbage unit. In many old houses this is often a problem.

Thiel & Welder, Inc., large home furnishings store of Bellingham, was installing a new all-steel cabinet electric kitchen. It was being placed up front and near the entrance where it will catch the eye of everyone who enters. With the metal cabinets built as units, complete with electric lights, outlets and convenient wire rod shelves, this home furnishings house can now sell an electric kitchen as it sells other furniture, said Irving Alvord, manager of the appliance department.

Even plumbing houses are interesting themselves in the electric kitchen. For years a straight plumbing, heating and sheet metal shop, Lent's, Inc., of Bremerton, started handling electrical wiring supplies, then became interested in electric heaters and ranges. Now it has just completed a new electric kitchen near the front of the store. Already a dealer and installer of sinks, Lent's feel it has a logical kind of business to sell electric kitchens complete.

Electric City Store of Bremerton also plans an electric kitchen this spring, according to Harry Benton, its manager. It will be a composite kitchen and capable of being used with any of the lines this company carries in stock.

To customers of refrigerators who had purchased in December and January just before the price drops this company did a genrous thing. It credited them a percentage refund on their payments so that they would not regret having purchased at a higher price just before the drop. This has created excellent reaction and Benton feels that it will pay off in future business. The company handles its own paper and can do this sort of thing without complications.

Many Sears Roebuck & Co. stores arrange stock to make an electric kitchen display. D. L. Primrose, Jr., assistant manager at the Chehalis store, had one such on the mezzanine floor, but was having a hard time keeping stock in it, for while the manager was away at a managers' conference the store was holding a special assistant manager's sale, making him "king for the week" and the merchandise was moving out so fast he couldn't keep the kitchen intact. The cashier rang a big bell every time a major item was sold

Long established as a plumbing and sheet metal company, Lent's Inc., of Bremerton, Wash., has been active in electric appliances lately, and has just installed this new electric kitchen. Harold D. Lent, above at left, had the help of Mary West, home service representative of Puget Sound Power & Light Co. at its grand opening

Electrical departments of Lewis County Hardware Co., Chehalis, Wash., occupy a space along one side of the store, but floodlights suspended from the balcony give them prominence—an inexpensive but effective idea. At right above is the captain and the crew at Price Music Co., Chehalis; Marshall L. Anderson, manager, is shown at the extreme right; next to him is Earl Hitchcock, service man, and Charles E. Briske, salesman

and the entire sales force was working to break records.

Another electric kitchen, this on the second floor, was being installed in the home furnishings department of C. E. Blackwell Co., at Okanogan, Wash. Here C. W. Derby, manager of the department, planned to have a series of model furnished display rooms to sell the ensemble idea, and the first on the list was to be the kitchen. Cooking schools there, conducted by the home service girls of Washington Water Power Co., initiated the new kitchen last month. An interesting combination sale opportunity was mentioned by Derby. The appeal of the automatic washer such as Bendix, can be capitalized upon to sell a water heater too, for the automatic washer requires lots of hot water, automatically.

Aside from electric kitchens, dealers were employing many sales ideas in new ways. For instance, B. B. Furniture Co., of Bellingham took advantage of leap year's extra day to clear old stock with an "extra day" sale. This store, with an old time open elevator shaft and glassed in cage, made the most of a shelf projection at each floor level to set up small displays of merchandise, such as appliances, which those using the elevator could see in passing.

That plumbers are interested in the electric water heater too was given further support by S. H. Hawk, of Hawk Bros. Plumbing Co., Ontario, Ore. He sells the electric water heater as a part of the plumbing fixtures in a new house for which he does the plumbing.

Another dealer doing a big water heater business is W. Bev Wilson, of Okanogan. Originally a salesman for Washington Water Power Co., he started a furniture store a few years ago and has always featured electrical appliances. His appliance salesman, Fred Chittester, last year won second place among all salesmen on the power company system for water heater sales. He placed twice in the six weeks campaign, and was the only suburban dealer salesman to place in the contest.

Good business the first months of the year gave promise of universally good business for dealers in that region this entire year. Other economic factors all seem favorable to it, and the electric kitchen idea has passed the pioneering stages now and is becoming stylish. That means business for dealers too.

Every year, Jack Mulhern (left, below), manager of the appliance department, Wahls, Inc., Bellingham, Wash., does over the kitchen to give it freshness. First year it was finished in knotty pine, this year in solid finish. At right, Emil Hellenthal, of Everett, Wash., at the spot in his store at which a new electric kitchen is soon to be installed. A housewares store, electrical appliances fit in perfectly and the two lines make sales for each other

IES Idea

Central Arizona Light & Power uses new sales slant on lamps

You don't have to make a survey to find out that women love clothes, but one conducted by the lighting department of the Central Arizona Light & Power Co. proved indirectly that women's clothes can help to sell IES lamps. And the utility also found out that IES lamps themselves are good salesmen, if left on trial and given proper demonstration in homes.

The utility, with these facts in mind, offered twelve weekly prizes of any $29.50 dress of any selection that women might choose from three of the principal Phoenix department stores, with the further provision that at the end of the 12-week period, a $100 ensemble would be awarded. These prizes were to be selected on the basis of a weekly drawing. Only way a woman could obtain a ticket was to allow a lighting demonstration to be made in her home and to try an IES lamp overnight, or to purchase an IES lamp outright from a dealer.

Six girls and four men were engaged in the campaign, calling on 25,000 customers. Folders were first left with customers, with simple instructions about the contest. These were prepared to resemble a fashion advertisement, with assistance from the advertising departments of the department stores cooperating in the program.

Later a home service girl or salesman left the IES lamp at those desiring a demonstration or wishing to compete in the contest. Lamps were left for several days, and then a straight selling job was done.

Results were excellent. One home out of every five permitted lamps to be left for demonstration. One out of every two demonstrations resulted in a sale. Final sales totals were in excess of 2,500 units sold direct, plus approximately 1,150 more IES-type lamps sold by dealers, who had been supplied with copies of the fashion folder and tie-in window cards.

The lamp was an IES model selling for $7.95 retail and was available to all dealers at their regular discount through a local jobbing house. Customers who preferred another model lamp to the one being featured were allowed to exchange the one purchased for a newly chosen model. Terms were $7.95 with the next electric service bill, or 95 cents with the bill, with $1.00 a month for the balance, plus a small carrying charge.

The north woods may have its mythical Paul Bunyan, but Idaho Power has its supersalesman, Joe Guimont, who was brought to life in a left-handed way at a Pocatello sales stunt not long ago as "Joe Geemoe", the super-dumb salesman. As impersonated by Keny de Late (right) he is receiving instructions from Steve Rhodes, division sales manager at Pocatello. By showing how not to be a good salesman Joe taught a selling lesson.

Appliance Council

British Columbia League stirs up new interest in appliances

Electrical appliance merchandising has been very considerably stimulated in Vancouver through the operations of the Home Appliance Council, a division of the Electrical Service League of British Columbia. This organization aims to augment rather than duplicate the regular merchandising activity of electrical distributors and dealers. It co-ordinates the preliminary efforts and publicity of these various business organizations into short campaigns and it has been definitely proven that these campaigns have increased sales by directing public attention and arousing enthusiasm of dealers and salesmen alike.

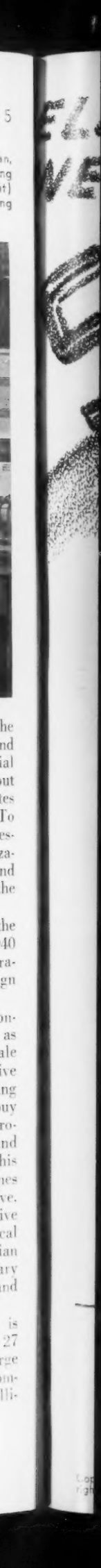
H. C. Darrock, Canadian General Electric is chairman of the Council for the ensuing year while other members are M. D. Brooks, Northern Electric, vice-chairman; G. N. Gardner, Canadian Westinghouse Co., Ltd.; H. Merilees, promotion manager, B. C. E. Railway Co. and E. Cooper.

Naturally publicity plays a major part in the operations of the Council and under the chairmanship of James Lightbody, publicity manager of the B. C. E. Railway Co., a committee has been formed comprising H. Merilees, D. Brooks, J. C. Cooper, P. Ferguson, A. G. Meekison, M. S. Thompson, and H. Stewart. The committee utilizes the regular advertising of distributors and dealers and supplements this by special newspaper pages of publicity laid out by the committee and released on dates according to the campaign schedule. To maintain the enthusiasm of the salesmen and the various dealer organizations, news bulletins are sent out and breakfast meetings held during the campaign period.

Four major activities planned by the Home Appliance Council during 1940 are a merchandising conclave, refrigerator campaign, sight-saving campaign and a radio campaign.

The lighting campaign will be conducted in September and will have as its object the promotion of the sale of indirect lighting fixtures. This drive is to get more dealers actively selling lighting and to enable the public to buy the type of lighting that is being promoted in educational advertising and other activities. The program of this campaign will run along similar lines to that used in the refrigeration drive. The committee in charge of this drive consists of Miss Rae Jackson, Electrical Service League, E. Ackland, Canadian General Electric and R. Hall, Secretary of the Electrical Service League and committee chairman.

A somewhat similar campaign is planned for radio from September 27 to October 12. The committee in charge being headed by F. A. Boyle and composed of J. E. Johnson, Jas. Hall, Allison Jagoe and H. Stewart.



PRINT IN BINDING

ELECTRICAL WEST

SALES GUIDE

CLEAN-UP!

Do it with Dishwashers

Almost everyone who eats has dishes to wash. That's the ultimate size of your market. Why sell them? They're the next appliance to clean up with.

No trade-in problem yet, no price war, no cheap competition. Good margin for specialty selling; public acceptance just starting.

Who'll buy first? Direct your efforts to these prospects; they're readier to buy now:

Working woman—married or single, needs this help to manage both her jobs. **Overburdened,** such as with several small children, tired or in poor health. **New baby** in the home and conscious just then of the need to sterilize everything.

Germ conscious—many people are. They are easiest to sell. **Illness**—where there's an invalid, a semi-invalid, or lots of sickness, especially where segregation and boiling of dishes is needed.

Other preferred prospects—the **well-to-do,** those who take **pride in their home;** those with **maid trouble;** those **building** or **remodeling;** owners of **summer cottages** who really want rest there.

Husbands tired of helping with the dishes.

Back of every dishwasher stands a water heater—sell both.

DISHWASHERS

MAY 1940

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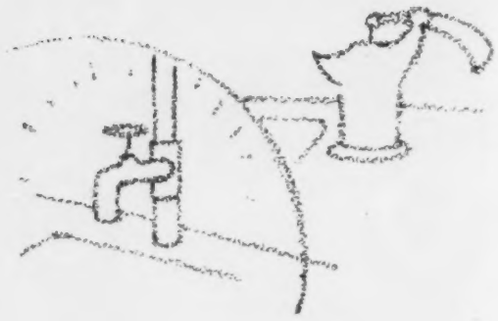
OH, BY THE WAY—

Speaking of the Cost,

REMEMBER WHEN---

1870 Faucets with running water were first placed in homes, they were considered just as much a luxury as dishwashers are today, and cost just about as much to install, plumbing and all. It was not long before everyone wanted them and running water became a necessity instead of a luxury. The old hand pump which the running water system replaced was cheaper, yet the added convenience was worth the difference. So it is with electric dishwashers today.

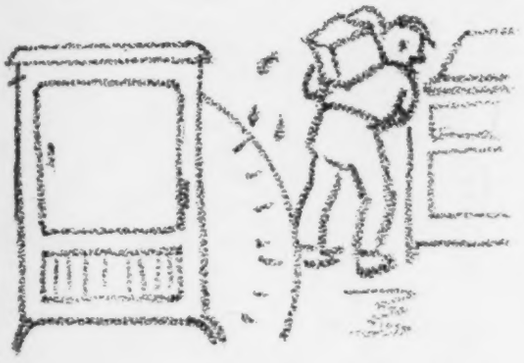


1890 Bathtubs were first installed in homes, they were thought to be sinful, not to say the height of extravagance. Yet today the bath room is often the showiest place in the entire new home, in spite of its very limited use compared to the kitchen. Bathtubs, too, cost many times as much as the old tin wash tub which they replaced, yet the added convenience and comfort they provided was thought to be worth it. Today few homes without bathtubs exist.

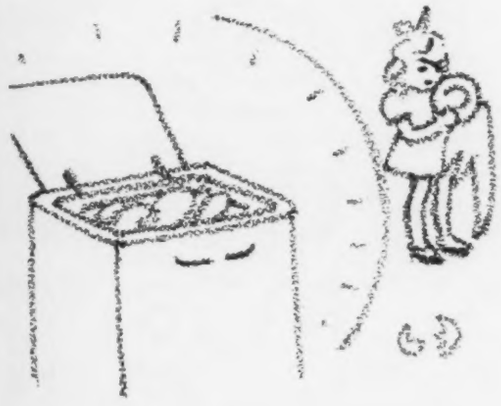
1900 Electric light was beginning to replace the coal oil lamp and gas jet, it was considered the utmost in luxury. Only the very rich could have this new, convenient and clean light. The wiring of the home to provide one drop light in each room cost much more than a dishwasher does today. Yet people installed electric lighting because it was so much better a way to light a home. Today electric light is a necessity and is used lavishly by all.

SUGGESTED BY

1920 Washing machines came in to replace the old scrub board and tub, they cost more than a dishwasher by a good deal. Yet people bought them, though they cost many times as much as the tub and scrub board they displaced. Today more than half the wired homes have a washing machine and many have an ironer as well, replacing a far less expensive hand electric iron and the even cheaper sad iron; but evidently their service is worth it.



1925 Refrigerators came in to replace the old ice box, they too cost many times what they replaced. Early refrigerators cost more than the present electric dishwashers, yet because of the sanitation they furnished, the preservation of food, their convenience and beauty, people eagerly bought them. Now those homes without electric refrigerators are unsatisfied because they all want one. As with all the other improvements brought into the home their extra cost was worth it.



1940 Dishwashers seemed to be just as much of a luxury, as costly by comparison as these other necessities of today. But dishwashers too, bring such a superior method of handling one of the most tiring, unpleasant and unsanitary household tasks that they too are worth it. Compared to the dishpan, dishrag and dishtowel they replace they are no greater a luxury than the other "necessities." While their prices are no more than a high grade spinner washer they are used 20 times as often and give daily satisfaction and help. Soon no home will any more be without one than it is without light.

YOUR SALES ALLIES

PUGET SOUND POWER & LIGHT CO. . WASHINGTON WATER POWER CO. . PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. . UTAH POWER & LIGHT CO. . IDAHO POWER CO. . THE MONTANA POWER CO. ROCKY MOUNTAIN ELECTRICAL LEAGUE

HERE'S AN IDEA

You'll be more effective if you tell the strongest reason you have—sanitation—in a positive instead of a negative way. You can easily overplay the fear of germs and describe dishes not washed electrically as so horrible that you may cause your prospect to react the wrong way.

Instead, turn sanitation around to show its positive benefits—by avoiding the dangers of being without it. For instance, say that the dishwasher will:

Bring better health since it eliminates those questionable possible germ refuges, the dish rag and dishtowel. No dentist or doctor is satisfied to wash his instruments so. He sterilizes them at high temperatures. Milk isn't safe until it has been pasteurized by heating it to 140 deg. F. for 20 minutes. To assure the healthfulness, the safety of dishes and to protect the family health, the dishes need washing at higher temperatures than the hands will stand. At temperatures hands can stand—80 to 110 deg.—germs breed fastest. At dishwasher temperature—150 deg.—germs are killed. Sickness cannot be carried from one to another by dishes so washed.

Freedom is the next big buying reason. Dishwashers bring freedom from the least attractive part of housekeeping; **more time** to spend with the family. No arguing with the children over doing the dishes nor breakage when they do. No piles of dishes on return from a trip. If ill, or occupied, or away on vacation, children or husband can do them quickly and painlessly—in fact it's fun.

Pleasure of entertaining is unmarred by dread of stacks of dishes afterward. **Meals taste better** to a woman who doesn't have to look forward to dishes afterward.

Savings—first in dishes; there is less breakage, especially important with valuable dishes. Save also on hand lotions, manicures; shampoos, finger waves ruined by standing over a dishpan. Save on dishmops, towels, soaps, scrub brushes, aprons, floor mops, laundry of dishtowels, etc.

Beauty is important to modern women. A dishwasher eliminates standing at a hot dishpan, steam spoiling hair dress, hot water damaging hands, ruining manicure. Better disposition should result, and that means less wrinkles, a happier appearance, a more youthful one.

MAKE YOUR SALES POINTS POSITIVE

•

Show advantage rather than exploit fear

Pride can be taken in a home so equipped. There is pride in cooking, too. But there is no pride or satisfaction in dishwashing by hand.

Appetite should be better when foods are eaten from sparklingly clean dishes.

Best way to overcome the peculiar prejudices that women often have against dishwashers is to let them try them out themselves. Two ways to do this are advisable.

Home demonstration with a portable model is best **if** handled right. It must be made clear that the temporary inconvenience of filling it by hose to the sink and draining it so will not be characteristic of the permanently installed dishwasher. When this is made clear, and the prospect is asked to prove with it that it **can** wash dishes clean, then the added convenience of almost automatic operation with an installed dishwasher sink will bring added pleasure.

Leave the demonstration model several days, long enough to get the family used to it and the freedom it brings. It is a case of giving them "the feel of the wheel."

Model Kitchen equipped with a working electric dishwasher in the store is equally good. Bring skeptical prospects over to it to see the kitchen, then "while you are here, let me explain the improvements in these dishwashers." Even the woman who "wouldn't have one on a bet" can be shown enough of its real value to help her change her mind. Again it is best to have her operate it herself, feel how easy it is.

Dishwashing Battle such as that staged to thousands so successfully at the New York World Fair, is one of the cleverest promotion ideas you can use for a fair or a cooking school or similar occasion. Have an operating dishwasher on one side, a sink on the other side of the stage. Let two women "fight it out to the finish," the battle between Mrs. Modern and Mrs. Drudge, one doing the set amount of dirty dishes electrically, and easily, while knitting or reading, the other racing to finish, splashing water, breaking a dish or two, and then not getting them clean. It is always a "wow," and it kills sales resistance by wholesale, and produces prospects.

YOU MIGHT TRY

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Future Campaigns

Western utilities organize programs for summer months

Replies to ELECTRICAL WEST's questionnaires concerning activity among the advertising and sales departments of utilities throughout the West brings news of increased action as summer moves into the picture. Here's a few reports:

British Columbia Electric Railway Co., Ltd.—Sixth annual President's Month campaign for special prospect prizes. Promotion on ranges, refrigerators, waterheaters ties in with this event. For June, appliance display and advertising for June brides, featuring lamps and traffic appliances.

Bureau of Power & Light, Los Angeles—"Shopper Stopper" electric range campaign for May and June; local dealer electric range expositions and electric range window contest plus "The Range to Catalina" salesmen's contest.

City of Glendale, Public Service Dept.—May 6-18, special demonstration in local market. Food prizes given at department's cooking class.

Nevada-California Electric Corp.—Refrigerator campaign for May and range campaign for June.

San Diego County Bureau of Radio & Electrical Appliances—Refrigerator advertising for May. Spring Fair, April 30-May 5, with a Modern Home Ideas theme.

Southern California Edison Co., Ltd.—Evaporative cooler and electric roaster campaign for May; Treasure hunt appliance shows in Huntington Park and Ontario.

The Washington Water Power Co.—Residential range water heater campaign for May; also "Fisherman's Derby" salesmen's contest.

Utah Power & Light Co. & The Western Colorado Power Co.—Cooking, water heater, iron and ironers campaign for May; for June, table cookery, irons, roasters, hotplates, refrigerators, air conditioning and ventilator promotion.

● ELECTRIC RANGES will be featured in the first 1940 advertising drive by the Southern California Edison Co. Over 170 daily and weekly newspapers in Edison territory will be used, while 240 billboards located at strategic points will support this extensive newspaper campaign. Miniature "billboards" in 409 buses and interurbans running between Los Angeles and outlying districts will also support this big electric range drive. Colorful window streamers will also be used to tie in with this promotion.

● A NEW HOME SERVICE PROGRAM, Better Living, sponsored by the Washington Water Power Co., has been inaugurated over radio station KFPY, in Spokane, and featuring Lucile Ramirez, home service director with the utility. The programs consist of a 15-minute presentation twice each week. These programs are planned to tie in with current promotions, carried on by the dealers and utility. They tend to dramatize actual situations in the home and the benefits of electrical appliances. Various prizes will be offered at the end of each program for letters written on some phase of the current monthly promotions, rewards to be electric appliances.

● MORE THAN 100 Bendix home laundry dealers from Utah, Idaho and Wyoming gathered for a sales conference and unveiling of the Bendix new utility model in Salt Lake City, March 29. Cash Laufersweiler, Seattle, Northwest district manager, presented the new model and spoke on advertising plans for the future. Leland B. Flint, general manager, Flint Distributing Co., was chairman.

APPLIANCE SALES REPORT, 1940

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		Northwestern Elec. Co.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons G. & E. Corp.[5]		Southern Calif. Edison Co., Ltd.[6]		Utah Power & Lt. Co.[7]		Wash. Water Power Co.	
	1940	1939	Curr.	Mo.	Curr.	2 Mo.	Curr.	Mo.	Curr.	2 Mos.	Curr.	3 Mos.	Curr.	2 Mos.	Curr.	2 Mos.
Ranges	714	638			52	138			43	64	128	383	165	282	159	302
Water Heaters	265	216			13	30			44	78	48	135	37	60	146	268
Air Heaters, aux.	215	185							177	439						
Air Heaters, 220																
Refrigerators	1,261	639			383	579			611	1,077	3,645	8,250	652	1,054	509	855
Dishwashers	4	3											2	5	1	4
Washers	1,267	1,232			435	868			319	677	2,250	6,442	682	1,450	473	796
Ironers	77	139			45	112			56	105	291	877	58	158	49	66
Vacuum Cleaners	448	395			239	517			229	482	955	2,522	319	743	154	335
Radios	2,785	2,233			1 321	2,962			944	1,991	4,919	15,763	1,204	3,510	1,184	2,810
Mixers	2 05	161							65	151	200	814	85	371	100	273
Cookers, Casseroles	46	46			19	80			64	108	14	63	8	33	132	272
Irons	1,529	1,174							428	800	801	2,739	656	1,680	623	1,318
Waffle Irons	449	347							106	157	222	1,128	240	892	145	344
Toasters	789	581							258	467	363	1,434	268	1,050	323	785
Table Stoves	413	383			639	1,440			111	181	159	537	125	386		
Heating Pads	376	290							176	338	116	677	186	1,028	154	363
Curling Irons											16	83	64	295		
Coffee Makers	655	526							337	572	254	774	132	323	328	662
Sewing Machines									110	224			146	317	80	147
Clocks	483	392							352	723	386	1,266	197	533	289	586
Fans	19	32									17	40	21	24	24	56
Floor Polishers																
Sun Lamps	128	88									27	96	10	22	11	21
Reflector Lamps																
Misc. Lamps																
Shavers											152	535				
Yard Lights													51	103		

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers for 3 months.

[2] Lists appliances sold by dealers in Portland area. Figures compiled by Northwestern Electric Company.

[3] Combined dealer and company sales from report of Montana Power Co.

[4] Figures are being consolidated with San Joaquin Power and are not available this month.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures include fans, curling irons and sun lamps.

[6] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.

[7] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

Violet Campaign

Washington Water Power salesmen besiege McElroy with flowers

"These were no shrinking violets—the exceptional sales results show that!" comments R. B. McElroy, general sales manager, The Washington Water Power Co. from a halo of flowery returns in the company's recent residential range and water heater campaign. The campaign was named in honor of McElroy's recent appointment to the office of general sales manager. Day after day during the campaign salesmen "said it with flowers" to McElroy with a shower of violets, each one representing the sale of an electric range or an electric water heater. Normally, March is a quiet month in major appliance sales, 150 appliances being considered a satisfactory selling job.

The monthly "Violets for Mac" campaign introduced a six months, sales activity known as the "Better Living Revue—in Six Acts," designed to promote the sale of ranges and water heaters. This "revue" is designated to be the major sales activity of the year, extending from March 1 to September 1. Frank A. Tool, manager—residential sales with the utility, further stated that the company expected to sell 3,600 ranges and 3,000 water heaters during 1940. At the outset of the year 1940, the company has a range saturation of 35.2% and a water heater saturation of 25.9%. In the face of this saturation, the campaign saw the sales of 458 water heaters and 424 ranges during the month of March and "violets."

The announcement for the campaign carried to salesmen the vision of their general sales manager, wearing a crown of violets. Enclosed were mailing cards with violets attached to send to "Mac." Salesmen were encouraged to "smother" the general sales manager with violets, congratulating him on his recent promotion. Byword among salesmen was "Let's pin a violet on the boss." During the campaign weekly reports kept salesmen and divisions informed about the centers of violet production.

In addition to the floral inducements, two trophies, presented by the president and the vice-president of the company, were awarded to the high division for ranges and the high division for water heaters. Winning divisions were honored by having their names inscribed on the trophies, practical pieces of silver, and by retaining the pieces until the next period winners were to claim them. These trophies are to be awarded permanently as over-all prizes for the six months' activity.

R. B. McElroy has reasons to smile as sales pour in from violet campaigners in the field

Besides the sales force, employes of the company joined in the campaign through the Tipsters' Club, by turning in names of prospects for ranges and water heaters. March saw an increase of 22 per cent in the number of tips turned in on ranges and water heaters by employees. Division prizes, the trophies and division pot of cash, encouraged employee participation.

Check List

Montana Power lighting salesmen conduct survey over system

A check list of the uses of electricity is being used effectively by Montana Power Co. commercial and industrial lighting men in a survey being conducted throughout the entire system. The check list, made up in duplicate, serves two purposes. One copy of the check list is left with the customer, the other one in duplicate retained by the company. It forms an effective prospect list for cooperating contractors and equipment dealers to use in soliciting business. The original serves to remind the prospect of other electrical uses he may yet use.

Lists are printed up for garages and filling stations, jewelry stores, doctors' offices, grocery stores, bakeries, variety stores, banks, drygoods stores, office buildings, meat markets, furniture stores, hardware stores, dentists' offices, cleaning and dyeing shops, barber shops, hotels, restaurants and cafes, drugstores and beauty shops. In one column are listed all of the uses of electricity in the particular type of store. Space is left for a check mark if the customer has any one of the uses listed. Another column is left for remarks.

Contractors and equipment dealers are urged by the commercial department of the utility to make use of these lists.

● Thor-Pacific Co., San Francisco is three-time winner in monthly sales contests among all Thor branches in the United States for greatest percentage of increase over quota. In recognition of this feat, George Dickie, head of that northern California and western Nevada sales division for the Hurley Machine Co., has been awarded the permanent posession of a handsome sterling silver platter.

Wedding

San Francisco man "bridegroom" in Westinghouse ceremony

From Eureka to Fresno more than 300 dealer guests came to the Western Furniture Mart, San Francisco, recently to attend the "wedding" of W. I. Powell, Westinghouse Supply Co., to the Westinghouse "Bride." This symbolic ceremony, with the cutting of a huge wedding cake, climaxed a two-hour show which effectively dramatized the Westinghouse national "Advise-a-Bride" contest, with its $23,000 in prizes.

Show participants from Mansfield, Ohio, included Gil Baird, advertising and publicity director of Westinghouse, and two sales promotion managers, M. M. Freeman, and H. R. Cummins.

THE PACIFIC COAST ELECTRICAL ASSOCIATION

Industrial Data Sheet No. 3

SUBJECT .....INFRA-RED DRYER
TYPE OF WORK.....AUTO PAINTING
PLANT.....HANNI & GIRERD, SAN FRANCISCO
SERVICE COMPANY.....PACIFIC GAS AND ELECTRIC

Prepared by J. R. Hedge
Pacific Gas and Electric Co.

Problem

Automobile body reconstruction on foggy days or during other periods of high humidity resulted in graying of paint or lacquer and required that the job be redone. Furthermore, rush jobs would not dry fast enough.

Solution

Installation of an infra-red dryer. Unit consists of a polished aluminum reflector mounted on a standard with adjustable connections so that the reflector may be placed in any position. Thus heat may be applied to any part of an automobile body. There are five 260-watt infra-red drying lamps arranged within the reflector, producing a load of 1,300 watts. The unit plugs into a 110-120-volt circuit. Complete reflector and standard cost about $25.

Operation

1. After a part has been sprayed and the solvents have been given a chance to evaporate, the infra-red reflector is placed about 10 to 18 in. from the work, so that the heat is directed on the newly painted part.
2. The unit is used on an average of 2 hr. per day, thus consuming about 2.6 kw.-hr. per day.

Realized Advantages

1. Bodies can be spray painted on foggy, humid days without graying the lacquer. Fast drying action speeds up rush jobs.
2. Time is saved, both on rush jobs and during periods of high humidity, and the elimination of graying results in no spoilage of sprayed parts.
3. Mr. Girerd states that he is very satisfied with the unit and would not be without infra-red drying lamps.

Applications Elsewhere

Any spray-paint establishment, particularly in the auto-body reconstruction field, is a potential customer.

Infra-red unit installed at Hanni & Girerd, 1765 California St., San Francisco. President of the plant is A. P. Girerd, C. Meyers is shop superintendent, C. Garlatz, paint shop supervisor

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 20

SUBJECT.....LEAD-POT HEATING
CUSTOMER.....THE PACIFIC ELECTROTYPE CO., SEATTLE
TYPE OF BUSINESS...ELECTROTYPE & ENGRAVING PLATES
SIZE OF BUSINESS.....8 EMPLOYEES
SERVICE COMPANY.....PUGET SOUND POWER & LIGHT

Prepared by H. Van Wyk for the Industrial Section

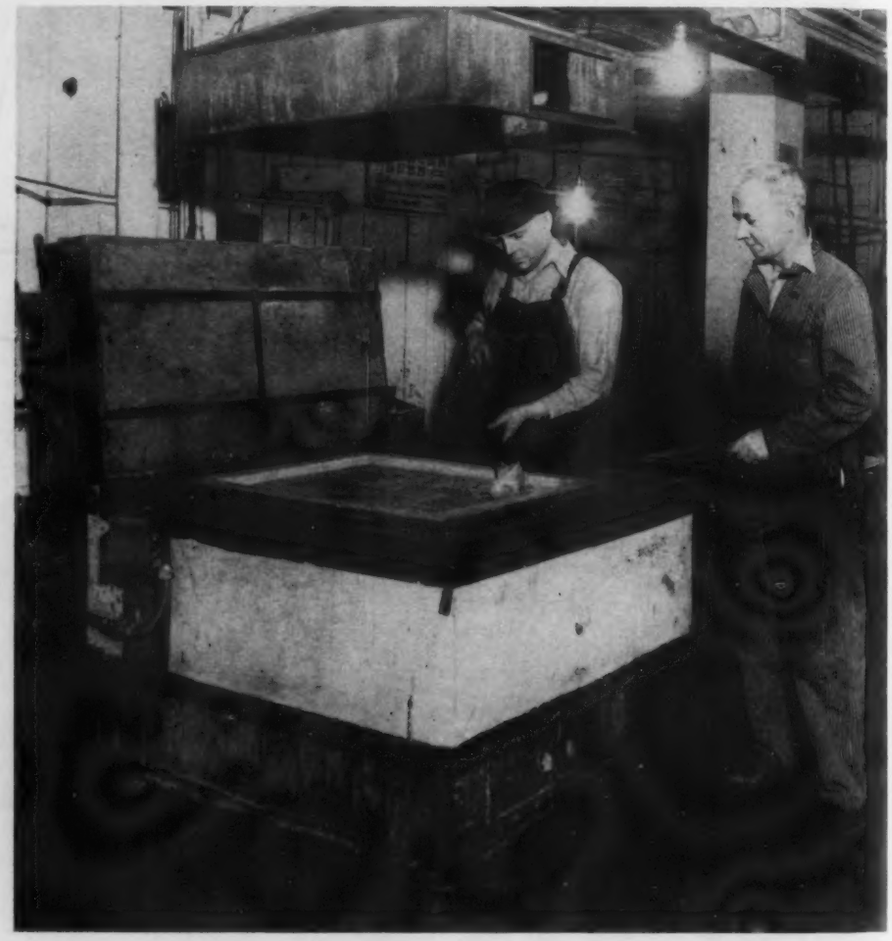
The pot used for melting lead in this process is rectangular and measures 22¾ x 28⅝ in. by 5⅜ in. deep. It holds about 1,500 lb. of lead compound.

Type metal is brought to 750° F. within 2 hr. A time clock is used to initiate the heating, so that the pot is up to temperature by the time the men go to work.

A pan containing the electrotype plate is floated on top of the lead, and a small quantity of the molten metal is dipped from the pot and poured into the pan. The pan is then removed and left to cool. The whole process takes about 5 min.

Because of the limited capacity of the pot, strip heaters were employed, and special, style-5 units were chosen because of the limited space outside the pot.

The entire pot is surrounded with 4 in. of insulation, and a removable cover prevents surface loss when the pot is not in use.



Advantages

The product has the following superiorities: (1) The backing is smoother; (2) the lead is more uniform by reason of better flow; (3) less subsequent cutting and trimming are required.

Electric heating improves this process by yielding: (1) accurate temperature control; (2) cooler operating conditions; (3) automatic operation with consequent reduction in labor cost; (4) less dross on metal; (5) elimination of fire hazard.

Equipment Installed

(Replacing fuel-fired equipment)

Device	Rating (kw.)	Equip. Cost	Install'n Cost
19—SE 2405-style Chromalox strip heaters @ $3.70	9.5	$ 75.05	
1—G-E 498028 G157-CR2992 R-1 midget thermostat		17.00	
Magnesium insulation		15.00	
		$107.05	$336.67

Operating Data

Product.....Electrotype and plates
Production.....40 per day
Labor.....50 man-hr. per month
Fuel.....Electricity, 600 kw.-hr. per month
Operating period.....2 hr. per day, 8-hr. standby
Temperature.....750° F.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

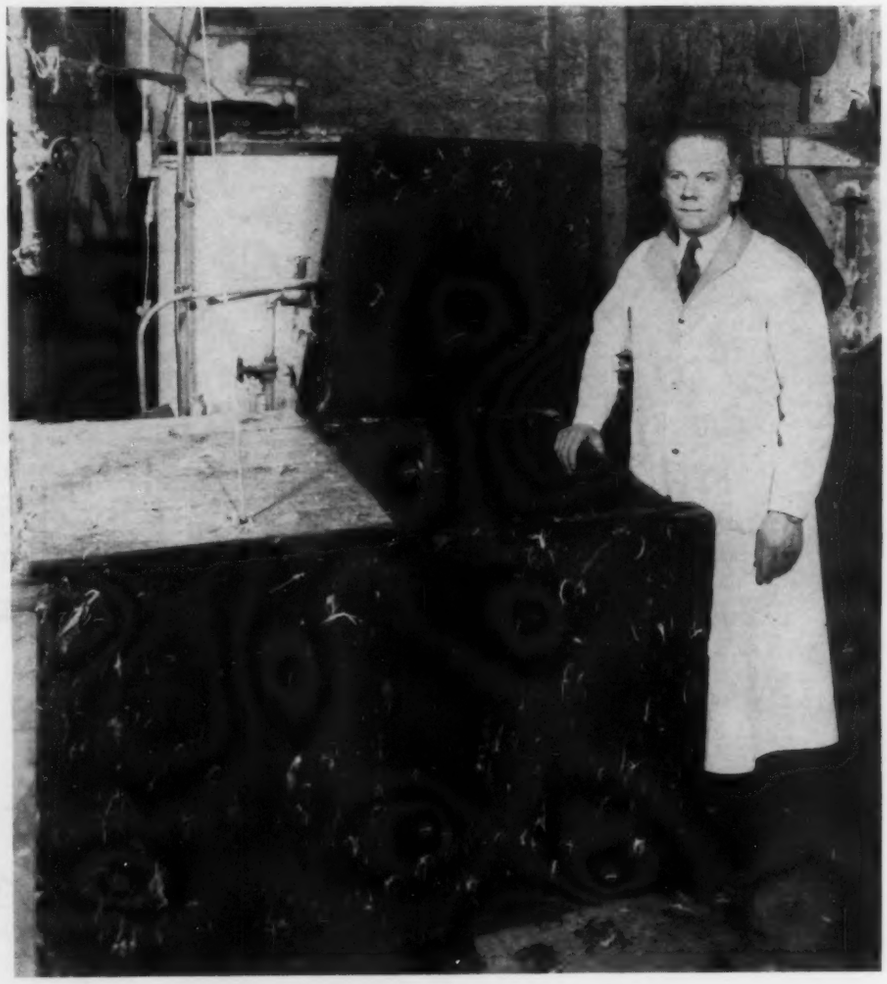
Utilization Data Sheet No. 21

SUBJECT.....POULTRY CLEANING
CUSTOMER...RUDY'S SOUTH PARK POULTRY CO., SEATTLE
TYPE OF BUSINESS.....POULTRY
SIZE OF BUSINESS.....8 EMPLOYEES
SERVICE COMPANY.....PUGET SOUND POWER & LIGHT

Prepared by H. Van Wyk
for the Industrial Section

The work of this firm consists of scalding and plunking chickens, for which purposes hot water is required. The picture shows two, 50-gal. wood tanks in the foreground. The cover of the cooler tank is raised, revealing the water level and the BLC immersion unit against the side of the tank. This tank is used for scalding purposes and kept at 150°F.

The tank to the left is kept at 200° and is used for plunking. The white tank in back of the wooden tanks is the off-peak water heater. It is maintained at 190° and is used for storing a reserve of hot water.



Advantages

Insofar as the product is concerned, the electric installation, yields a better quality of chicken in less time. The advantages of electric heating in this application include: (1) fire proof; (2) abundance of hot water; (3) automatic operation; (4) better temperature control; (5) low maintenance cost.

Customer's Statement

R. W. Haggblom, who is pictured beside the installation, says: "This equipment is as different from the old fuel installation as day from night. I am entirely satisfied with its performance. There is an abundance of hot water, and the cost of operating has been cut in half."

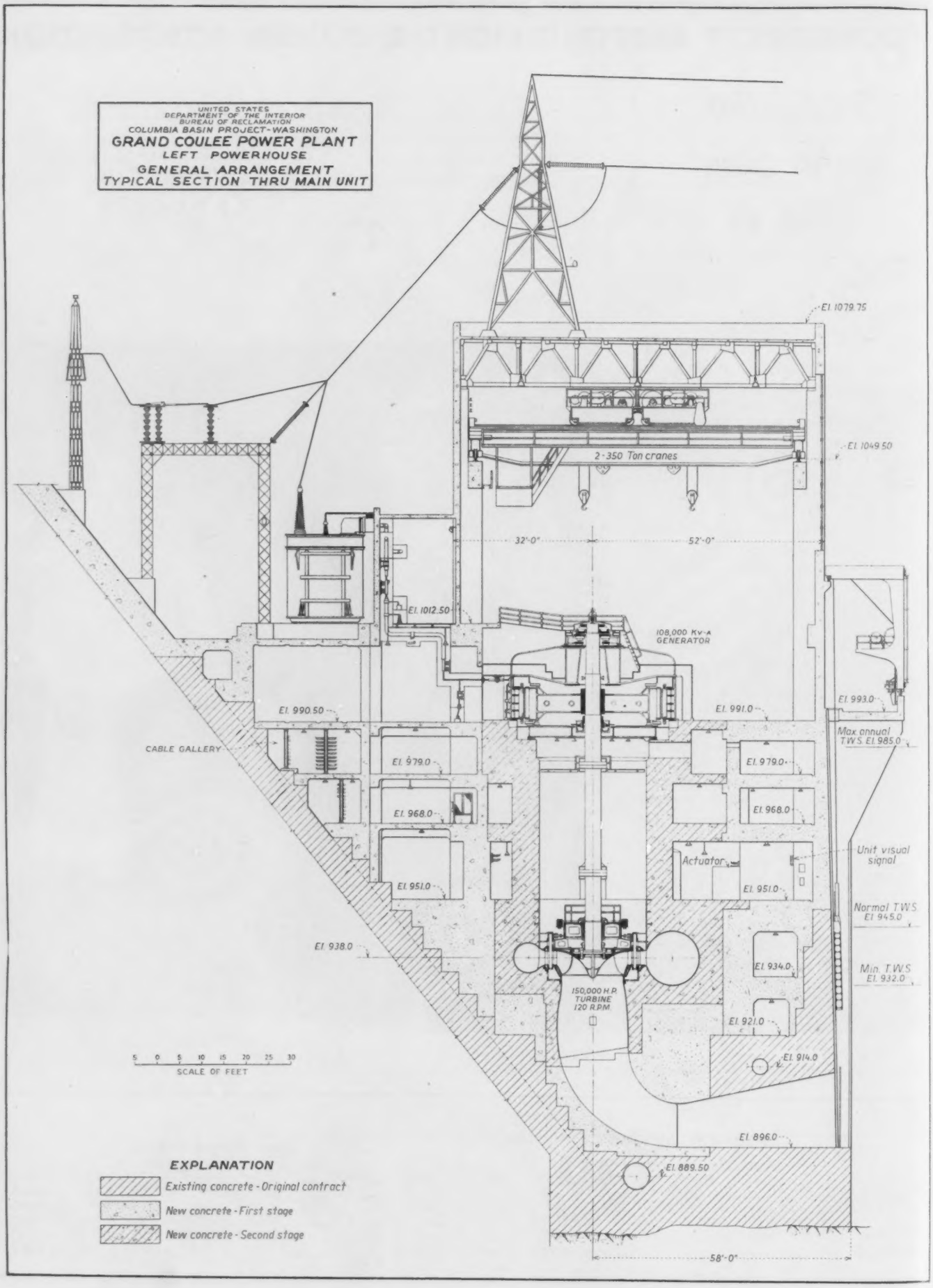
Equipment Installed

(Replacing fuel-fired equipment)

	Rating (kw.)	Equip. Cost	Install'n Cost
1—BLCF 112 Chromalox immersion heater.....	1.25	$ 13.20	
1—50-gal. off-peak water heater.....	3.00	126.00	
1—BLC 130 Chromalox immersion heater.....	3.00	17.50	
2—A. R. Thermostats @ $12.50.....		25.00	
		$181.70	$50.00

Operating Data

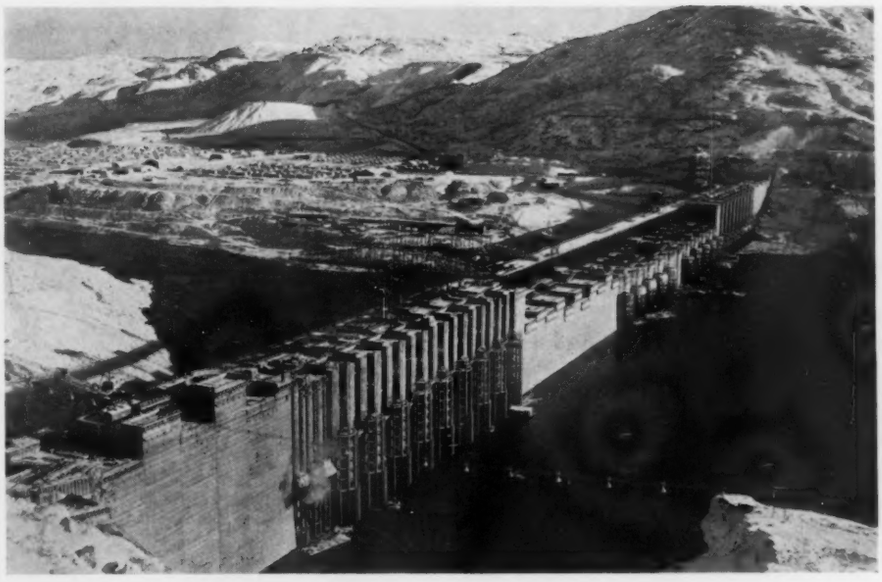
Product.....Plunked and scalded spring birds and hens
Production.....10,000 chickens per month
Labor.....300 man-hr. per month
Fuel.....Electricity, 1,200 kw-hr. per month
Operating period.....6 hr. per day
Temperature.....150°, 190° and 200° F.


UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLUMBIA BASIN PROJECT-WASHINGTON
GRAND COULEE POWER PLANT
LEFT POWERHOUSE
GENERAL ARRANGEMENT
TYPICAL SECTION THRU MAIN UNIT
El. 1079.75
El. 1049.50
2-350 Ton cranes
32'-0"
52'-0"
El. 1012.50
108,000 Kv-A GENERATOR
El. 990.50
El. 991.0
El. 993.0
Max annual T.W.S. El. 985.0
CABLE GALLERY
El. 979.0
El. 979.0
El. 968.0
El. 968.0
Actuator
Unit visual signal
El. 951.0
El. 951.0
Normal T.W.S. El. 945.0
El. 938.0
El. 934.0
Min. T.W.S. El. 932.0
150,000 H.P. TURBINE 120 R.P.M.
El. 921.0
El. 914.0
El. 896.0
El. 889.50
5 0 5 10 15 20 25 30
SCALE OF FEET
EXPLANATION
Existing concrete - Original contract
New concrete - First stage
New concrete - Second stage
58'-0"

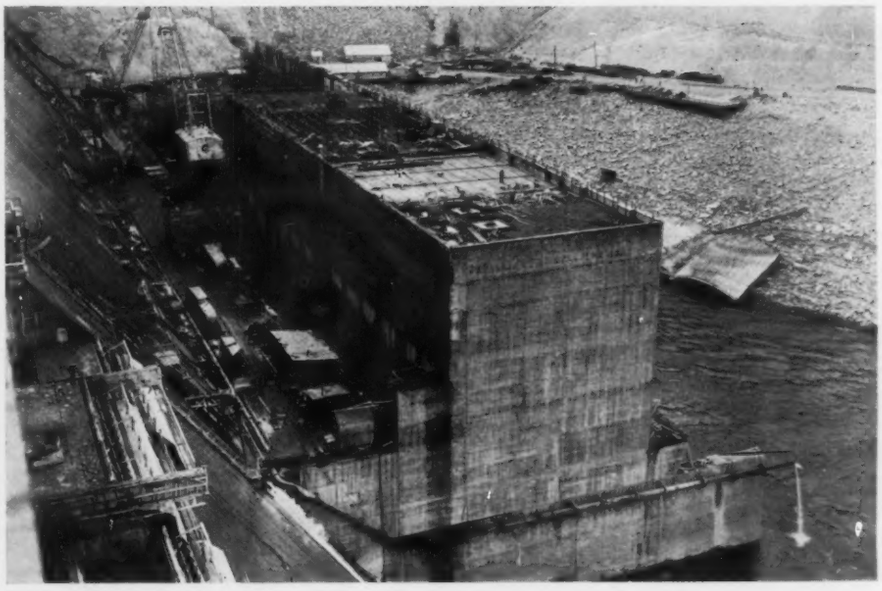
Grand Coulee

Electrical phase of construction draws near; generators en route

Steadily, the biggest dam on earth takes shape. The Bureau of Reclamation names 1941 as the year of initial operation. Its present status can be judged from the pictures at the right.

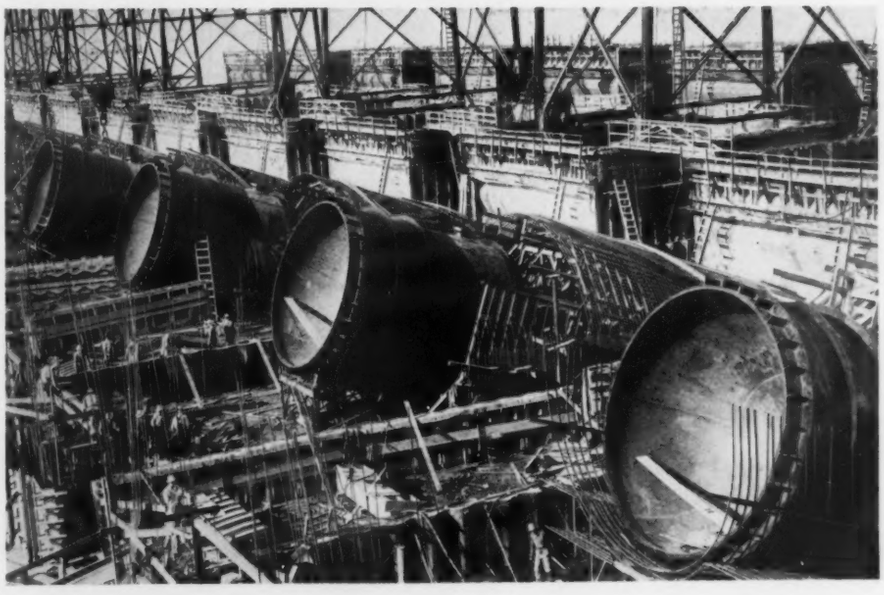


The upper view is toward the Northeast. Between the higher power house and abutment sections appears the 1,650-ft. spillway section. Upstream water level is about 80 ft. above downstream and just below the penstock entrances. Upstream is to the right. The completed dam will rise 131 ft. above the deck of the trestle, 26 ft. above the highest of the cranes. It will carry a 30-ft. roadway, level with the highways at the ends of the dam. Mason City and, beyond it, the sand and gravel pit and processing plant, appear in the background.



At center is a view to the northwest over the power house, which is rapidly nearing completion. The generator section of the building is 85 ft. wide, nearly 200 ft. from the bottom of the draft tube outlets to the parapet. Including service and control bays, the building is 765 ft. long. Planned, but not scheduled, is a similar building at the eastern end of the dam. Each will ultimately accommodate nine 108,000-kva. generating units.

Three generators are now under construction at Westinghouse's plant, three turbines (150,000-hp.) at Newport News Shipbuilding & Drydock Co. The west power house (shown) will also accommodate three 10,000-kw. station-service units. Two 14,000-hp. turbines have already been delivered by Pelton Waterwheel Co., and two generators are in transit from Westinghouse.



In the lower view are the upper ends of the 18-ft. penstocks with hemispherical bulkheads in place. The penstocks were made at a plant 2 mi. from the dam, from plates rolled and planed in Chicago. The penstocks were made up in sections to pass through 24-ft. octagonal tunnels. Space between penstocks and tunnel walls will be back filled with concrete.

At left is a section through a main unit. As indicated by the scale from top of generator to bottom of turbine is more than 80 ft.

Correcting on the Low Side

Many benefits from 460-volt capacitor applications in San Joaquin

By H. H. Minor

SINCE the pole-type capacitor unit became available some few years ago, utilities have found it to be a very handy tool. Until such units were available, very little, if any thought was given to power-factor correction of distribution circuits except through rate structures that made it advantageous for the customer to correct his own power factor. Such correction, of course, benefited the utility and was paid for by lowered revenue from the particular customer involved.

Fundamentally such procedure was and is the one that results in the most efficient use of the corrective equipment installed. The benefits of lowered reactive component of current are enjoyed not only by the customer but also by the utility. That smaller reactive component means lower losses, less line drop, better transformer regulation all the way from the equipment using the current to and including the machine that produces the current.

Were it possible to provide all the power factor correcttion needed in that manner; or, in other words, if all loads to be served were at 100% power factor or approached that condition, the problems of distribution design would be greatly simplified. Such an ideal situation cannot be approached, however, through power-factor-correction rate clauses alone.

More highly reactive loads are continually being connected. Instead of the large customer with an induction motor load, or groups of such customers being the principal cause of lower power factor, we now find that motorized appliances, tubular lighting, refrigerators and air-conditioning equipment are all helping reduce power factor. We no longer speak of, or think of, residential loads as unity or even high-power-factor loads.

The rapid growth of such loads, coupled with the efforts of the utilities to engineer their distribution systems instead of just letting them grow, has made it necessary that power-factor correction be carried on by the utility itself. As is usually the case, when a problem like that is evident, the manufacturers provide the equipment best suited to the particular solution.

While the capacitor itself is not new, the convenience, dependability, and moderate cost of present pole-type capacitors are. These have made wholesale power-factor correction an economic possibility.

Pole-type capacitors are manufactured for both utilization and distribution voltages, ranging from 230 to 13,200 volts. The most commonly used size is the 15-kva. unit. They are so standardized that external dimensions for various voltages and makes are similar. The same hanger will fit all.

Relative Costs

Their cost per kva. varies for different voltage ratings: 2,300 or 4,000-volt capacitors are the lowest in cost, partly because of their greater use. Assuming their cost as 100% the relative costs of other voltages ratings are:

230 volts	220%
460 volts	110%
4,600 or 6,900 volts	125%
12,000 or 13,200 volts	167%

For the most part, utilization voltages are 115 or 230. Distribution voltages may be 2,300 or higher. A relatively small percentage of power loads are served at 460 volts.

Thus, for the utility to attempt to approach the ideal situation of providing corrective equipment at the load usually requires an investment which is prohibitive when compared to correction on the primary circuit. The only difference in total benefit would be that with capacitors installed on the primary the distribution transformers, the wiring and the equipment directly serving the load involved would not partake of the corrective benefit.

Further, primary capacitors may be grouped so as to effectively provide correction for a number of loads, thus effecting a further saving in installed costs. By far the greatest use of pole-type capacitors has been on primary lines of 2,300-4,000 volts. The most common installation is 12 15-kva. units, 60 kva. per phase.

Many installations of primary capacitors have been described in this and other magazines and in manufacturers bulletins. The results obtained from these capacitors have been shown and their economic justification proven.

Secondary More Ideal

However, it is a fact that wherever the use of secondary capacitors is economically and physically practicable, the ideal condition will be more nearly achieved.

If the whole picture is scanned, if all the factors involved are considered and the benefits evaluated, it is usually very easy to justify economically the cost of a capacitor installation on a fairly heavily-loaded distribution feeder. When such justification is possible the choice between primary and secondary capacitors can be made by evaluating the added benefits of the secondary over the primary installation and comparing that with the difference in installed cost of the two.

This simple calculation will usually show that the installation of 230-volt capacitors is not justified in comparison with primary installation at any distribution voltage.

460 Is Another Story

This general statement does not apply, however, for 460-volt installations. It will be noted from the unit costs mentioned above that 460-volt capacitors cost only 10% more than 2,300- or 4,000-volt units, and cost less than 4,600- to 13,200-volt units.

A considerable amount of 460-volt service exists on the 12,000-volt distribution of the San Joaquin Power Division, Pacific Gas and Electric Co. All agricultural pumping plants of 50 hp. and over are served at 460 volts. Many of these distribution lines are heavily loaded, at least if judged by voltage drop. Capacitor installations are easily justified.

In these cases, 6,900-volt capacitors connected Y, or 12,000-volt units connected delta might be used. However, it is less costly to use 460-volt capacitors connected delta on the secondaries of the transformers serving the load. The secondary capacitors cost but 88% of 6,900-volt units. One has to go no

CAPACITORS ARE VERSATILE

further for economical justification of the 460-volt units.

Agricultural Service

The added benefits, however, in many cases are considerable. A large number of 100-hp. motors are used. They are almost universally operated at a considerable overload. Normally such motors would be served by three 37½-kva. transformers. But experience has shown that larger transformers are needed. This is due to the overloading of motors coupled with their continuous operation during summer months.

The use of secondary capacitors at these transformers so reduces the kva. load placed on them that the smaller transformers are ample in capacity. At such an installation, 45 kva. of capacitors are used, costing about $400 installed. The difference in cost of the transformers involved is about $290. Thus, 72% of the cost of the secondary capacitor installation is saved in distribution transformer cost alone.

A wholesale example of this type of saving occurred in connection with a large agricultural development. Some 50 irrigation plants were served at 460 volts. The motors were 75 hp. each.

Forty-five kva. in 460-volt capacitors were installed at each of these plants. These installations were part of 4,000 kva. of 460-volt capacitors installed to reduce the kva. load on 12-kv. feeders and a regulator station serving this area.

Water conditions made it necessary for the customer to replace his 75-hp. motors with 100-hp. The capacitors at these plants obviated a change in the distribution transformers.

Oil-Field Service

Here is another aspect of the case. In general, oil field load is served at 460 volts. That fact has made it possible for many oil field customers economically to justify capacitor installations where their rate carries a power-factor-correction clause. In one area, where the utility started the ball rolling by installing 900 kva. of 6,900-volt capacitors on two 12-kva. feeders (and later followed with 1,080 kva. more), the oil-field customers have installed enough secondary capacitors so that the utility has been able to move some of its original installations to other lines.

The installation of the 460-volt capacitors on the secondaries of agricultural transformer installations is very simple. A two-pole structure is used adjacent to each plant upon which the transformers are mounted. They rest on 6x8-in. timbers. A 15-kva. capacitor unit is placed in a single unit hanger bolted to the platform timber directly below the secondary terminals of each transformer. The capacitors are directly connected to the transformer secondary leads.

No fuses are used, the transformer fuses being considered sufficient. No grounding is necessary as transformers and capacitors are connected delta, and any grounding of the transformer secondaries likewise grounds the capacitor circuit.

Thus, labor to install is kept to a minimum, and no material at all is required except the capacitor, its hanger and two very short leads.

About 6,000 kva. of 460-volt capacitors have been installed at agricultural plants in the San Joaquin Valley during the past three years. Not a single case of trouble has occurred in any way connected with the capacitors. It is contemplated that some 5,000 kva. will be added during the present year.

It was stated at the beginning of this article that the capacitor had proved to be a handy tool. The 460-volt capacitor, in the applications described above, is more than a handy tool. It is a means of quickly and most economically adding load-carrying capacity to the distribution system. It is a means of easily correcting poor voltage conditions. It is a big help toward reducing the cost of distribution.

CAPACITORS ARE MOBILE

Mustering Corrective Kva.

When the fishing is good, capacitors are moved toward Monterey Bay

THE duration of good fishing is uncertain. Commercial fishing for several years past has been very good in Monterey Bay. Consequently, cannery operations have been very active, growing to such an extent that the two 4-kv. feeders supplying the Monterey canneries from the Pacific Gas and Electric Co. substation 1½ mi. distant were loaded to capacity in the 1938-1939 winter season.

As it was feared that these feeders would most certainly be overloaded in the 1939-1940 canning season, were fishing to continue to be good, the Company was confronted with the problem of how best to provide increased facilities for an increase in a highly inductive load, the duration of which increase was as unpredictable as the inclination of the fish which brought it about.

Several possible solutions were considered, involving capital expenditures as high as $15,000, a rather large sum to gamble on the prospects of continued good fishing. Fortunately, since the

By John F. Roberts

cannery loads are heavy during the winter months when irrigation loads are at a minimum, a method was found for utilizing existing, temporarily-idle capacitors at relatively small cost. Thus the capacity of these cannery feeders was increased by reducing the reactive kva. through the use of capacitors borrowed from circuits serving irrigation loads in the vicinity of Soledad and Greenfield.

Units totalling 720 kva. of capacitance were moved to the No. 1 4-kv. cannery circuit and 450 kva of capacitors to the No. 2 4-kv. cannery circuit at a cost of $550, including fused cutouts and necessary line hardware.

The new capital is in the fused cutouts and line hardware, which are to be left in place when the capacitors are returned to the irrigation circuits at the end of the cannery season. The annual cost of transferring the capacitors is estimated at approximately $130. Thus for an initial capital expenditure of $420, or 36c per capacitor kva transferred, and an annual transfer charge of $130, approximately 700 net kw. additional line capacity was released to carry the increased cannery load.

Shifting the locations of capacitors with changing load conditions is comparable with the manner in which transformers are shifted when necessary. Because of this mobility feature capacitors are very versatile in application, avoiding large capital expenditures for increased line capacity to accomodate additional inductive load.

What EEI Is Studying In Apparatus and Design

By Glen L. Lane

OBJECT of this paper is to review some of the studies made in the last two years by the Apparatus and Design Sub-Committee of the Electrical Equipment Committee of the Edison Electric Institute.

Modernization of Stations and Equipment

As an example of the modernization of stations and equipment the rearrangement of L Street switch house, Boston Edison Co., was considered. The original installation consisted of eight generators with a doube-ring bus, divided into four sections with bus-tie breakers normally closed. The equipment was located on three floors—a reactor floor, a bus floor and an oil circuit breaker floor.

For the new arrangement the generator and bus-tie switching equipment was moved to the fourth floor of the switch house. The new structure was arranged in four compartments, separated by 5-ft. spaces. Each compartment provided for one double bus section, with equipment for two generators, bus-tie, one feeder and one reactor circuit to a synchronizing bus. Normally the bus-tie breakers are open and only one bus is energized. The feeder connects to the corresponding bus section below, which serves as a group feeder bus for the various transmission lines.

Electrically, the station consists of four separate two-generator units connected only through the synchronizing bus. This separation will materially decrease the amount of energy at a fault, reduce the required interrupting capacity of the circuit breakers, the magnitude of the voltage disturbances and switching surges, and will increase stability.

Each bus section compartment is divided into four aisles—two for the oil circuit breakers, and two for the buses and disconnecting switches. All cross-wiring goes through bushings packed with asbestos cement and as all aisles open into the spaces between sections, any fire, smoke or ionized gases should be confined to the aisle in trouble. Fire walls were also installed between feeder bus sections on the floors below.

Portable fire extinguishers, a carbon dioxide gas protection system and a permanent installation of water nozzles were added to minimize any danger from fire. Many of the older oil circuit breakers were rebuilt to increase their interrupting capacity. New potential and current transformers with improved insulation were installed, and all sections of the generating and feeder buses were provided with differential protection.

The modernization of this switching station was necessary because of the concentration of a large amount of power which the circuit breakers would be required to interrupt in the event of a fault in the station. By rearranging the buses and adding reactors, the duty on these breakers was materially reduced.

Air Circuit Breakers

Air circuit breakers have been used for many years to control station service auxiliary power but usually on circuits not exceeding 600 volts. For the larger auxiliary drives it has been necessary to use 2,300-volt motors with oil circuit breakers for their control.

The installation of a 50,000-kva. high-pressure turbo-generator at the Logan, West Virginia plant of the Appalachian Electric Power Co. called for a considerable increase in auxiliary power capacity and for switching equipment of the utmost reliability. Although oil circuit breakers have been giving good performance for many years, some rather serious fires had occurred about the time this project was started. Consequently, the possibility of using 2,300-volt oilless breakers was thoroughly investigated.

ITE Circuit Breaker Co., in cooperation with the American G & E Service Corp., carried on the development necessary to produce an air breaker suitable for the customers' requirements. These breakers resemble a conventional low-voltage, 3-pole air break magnetic contactor except that the operating solenoid is mounted in a separate compartment below the main contacts. Front and rear blowout coils are installed and the contacts housed in an insulating arc chute, sub-divided to assist in muffling and cooling the arc. Insulating barriers separate the poles. The main contacts are of silver, and the auxiliary contacts are of tungsten alloy.

The ITE truck-type switchboard at this plant consists of three 1,200-amp. breakers for transformer supply and bus-tie connections and 14 600-amp. breakers for the feeders. All motors, including a 1,250-hp. boiler-fuel-pump drive, are started at full voltage by closing a feeder switch either at the motors or at a switchboard.

These breakers are rated 125,000-kva. interrupting capacity, and the time from the initial tripping impulse to the interruption of the arc is 4 cycles or less.

General Electric manufactures a Magne-Blast air breaker, rated at 5,000 volts and 75,000, 100,000 and 150,000-kva. interrupting capacity. When the circuit is opened, the arc is magnetically blasted into a serpentine arc chute, where it is progressively lengthened and cooled until it is extinguished. Duration of the arc is 0.3 cycles, overall tripping time about 4 cycles. These breakers are used in vertical-lift, metal-clad-switchgear assemblies, with conventional oil-circuit-breaker operating mechanisms.

General Electric air-blast breakers, similar to Type-H breakers, are rated at 15 kv., 150,000 to 1,500,000-kva. Air pressure at 150 lb. is used to operate the mechanism as well as to interrupt the circuit. The high-pressure air stream removes the arc products through a specially constructed air-blast chamber and exhaust muffler, causing the circuit to be interrupted at the first current zero. The breaker is opened and closed by air and is trip free at any point. A tank holds enough air for two closing-opening operations. Following each operation, the air in this tank is quickly re-

plenished from the central storage system through a non-return valve. If the pressure should fall below a predetermined minimum level an alarm is sounded.

Westinghouse has extended its De-ion air breakers to include 2,500- and 5,000-volt ratings, 75,000, 100,000 and 150,000 kva., for station auxiliary service and motor starting. The arc is drawn in air and forced into a deionizing chamber where it is broken up into many short arcs which are moved over an annular path until the current wave reaches zero, when the arc is extinguished. All arc interruptions take place within the first half cycle.

These breakers are available in a single-frame size for 600-, 1,200- and 2,000-amp. capacity and are operated by standard solenoid mechanisms. They can be supplied for horizontal draw-out metal clad switchgear and require approximately the same space as a corresponding oil circuit breaker.

Westinghouse also manufactures a 15-kv. compressed air breaker with an interrupting rating up to 1,500,000 kva. (See ELECTRICAL WEST for April). The arc is drawn between contacts which open in a line perpendicular to insulating splitter plates. The compressed air stream is blown at right angles to the arc and quickly elongates it between these plates and extinguishes it at current zero. An air cylinder and piston operate the contacts. If the breaker is closed against a fault, interruption takes place immediately as though the mechanism is trip free because of the sudden injection of air above the piston. The tank containing compressed air at 150 lb. pressure is adequate for three interruptions.

Allis Chalmers has an air-blast breaker for application in cells, cubicles or metal-clad switchgear, rated 100,000, 150,000 and 250,000 kva., with 15-kv. insulation, and 500,000 kva. with 23-kv. insulation. Compressed air is used for opening and closing the contacts as well as for circuit interruptions.

Although all the above air circuit breakers compare favorably with oil circuit breakers in operation, maintenance, and space requirements, their present higher cost limits their use to installations where the increase in price is justified by the elimination of oil as a fire hazard. Freedom from oil in the station assumes an increasingly greater importance with many operating companies—in fact one utility representative boasted that the only oil left in the plant was that used in the electric clocks.

The use of air-blast breakers requires extra auxiliaries, such as compressors, pipe lines and storage tanks, in addition to the electrical circuits and controls. This additional cost is partially offset, however, by the reduction in the size of battery needed, as the only electrical energy required is that necessary to operate the trip and closing relay circuits.

Radio Interference

The Joint Committee on Coordination of Radio Reception has been working for some time on problems relating to the coordination of the power systems with radio circuits so as to eliminate as far as possible complaints of radio interference. The Codes and Standards Committee has approved the recommendation that the size of capacitors on portable devices be limited so that the current to the frame could not exceed 0.3 milliamperes.

NEMA representatives have proposed that a limit of 5,000 microvolts of radio noise be placed on small motors. This limit has been approved by the Joint Radio Committee and is now being transmitted for final approval to the EEI Codes and Standards Committee. This is believed sufficiently low to eliminate extremely bad motors but not low enough to eliminate all possibility of radio interference from such devices.

NEMA proposed the influence values shown in Table I for certain equipment used on transmission and distribution circuits.

NORTHWEST ASSN. REPORT

This is one of the papers presented by the apparatus and design sub-committee of the Electrical Equipment Committee (J. Hellenthal, chairman) at the 1940 meeting of the Engineering and Operation Section, Northwest Electric Light & Power Assn. Glen L. Lane is with Washington Water Power Co.

These limits will eliminate poor designs and defective apparatus but will not require any change in manufacturing practices. Manufacturers' data show that the material returned to the factory on account of radio interference exceeded these values. All measurements are made in accordance with the joint report on "Methods of Measuring Radio Noise".

There are two kinds of meters available for the measurement of radio noise. One manufactured by Tobe Deutschmann Corp. and RCA was developed in cooperation with the Joint Committee and in accordance with their general recommendations. The other, built by the Ferris Instrument Co. of Brooklyn, N. Y., measures in the carrier part of the circuit and was independently developed. Results are not yet available to determine whether measurements made with these two meters will give comparable readings. A few power companies have these meters but little data has been received so far by the Committee.

Informal conversations with the engineers of the Federal Communications Commission indicated that the staff divided the problem into four main headings as follows:

1. Radio communications which is now fully covered in Authority of Law and Rules of the Commission.
2. Minor devices using radio frequency such as remote tuning of radio sets, garage door openers, burglar alarms, remote record players, etc. on which the Commission has recently held an informal hearing for the purpose of making rules. It appears that if these devices are limited in power and radiation, licenses will not be required.
3. Apparatus using radio frequency currents where the radiation is not an essential part of the operation of the apparatus. In this class are included diathermy machines, carrier communication systems, etc. A bill has been introduced in Congress to give the Commission authority over these devices.
4. Devices where radio frequency apparatus is not essential to the operation of the apparatus and is only incidental. Among these devices are included power line equipment. At the present time the indications are that the Commission believes this to be a local problem and should be handled by local ordinances and State legislation. Several cities have passed ordinances dealing with the problem and there is an active association fostering these ordinances.

It was pointed out that there is considerable agitation for both state and municipal legislation on this subject and that unless this legislation is wisely drawn, it would probably prove quite embarrassing in certain situations.

A memorandum will soon be sent to all members of the committee, outlining the measurements necessary for a better basis for handling this problem and requesting their cooperation in obtaining this information.

Table I—Radio Influence Factor (Microvolts)

Circuit Voltage	Oil-Immersed Apparatus	Dry Type Apparatus: Current and Potential Transformers	Dry Type Apparatus: Cutouts, Lightning Arresters and Other Apparatus*
1201-15,000 volts	1,000	7,500	2,000
15,001-37,000 "	5,000	....	5,000
37,001-73,000 "	10,000	....	10,000

* This does not include ordinary pin-type insulators or thermonic devices such as rectifiers and inverters.

Controlling Power Flow

How phase angle, other factors, affect load balance among units

By J. F. Spease

POWER, in terms of the operation of electric power systems, comes from the prime movers. With fixed valve opening on a prime mover and constant conditions for the energy input is constant.

With constant energy input, any change in connected electrical load on the alternators will produce the proper prime mover speed change to make the electric output again match the constant input, except, of course, for variations in prime mover efficiency at the changed speed, which are of minor order except at extreme speed changes.

Thus, with fixed valve conditions on a prime mover, the electric power system would operate essentially at a fixed power output under varying connected loads and the speed would be the variable. Plainly, this procedure would not meet the needs of the situation, for it would mean that when a consumer added a motor load, for instance, he would automatically subtract this added power from the sum of the power already being used by other consumers, and the mechanism for this redistribution of power, as between consumers, would be the change in frequency of the electrical power delivered.

It would be much better, it is evident, to change the valve openings on prime movers in response to such varying electric power demands, and the common way to do this, of course, is automatically so operate these prime mover valves as to hold essentially a fixed prime mover speed, and the mechanism for automatically accomplishing this is the prime-mover governor.

With only one prime mover on a power system, the fixed speed concept is perfectly workable. With two or more prime movers and the governors all set to hold fixed speed, there is no basis for dividing the load between the units. This condition was met several years ago by arranging governors so they could be adjusted to hold a speed which dropped slightly with load if required. With governors adjusted to give this speed droop, the overall operation will be such that whenever one prime mover of the group starts to take load from the others, its speed will drop and its encroachment will cease. As this will be true for any unit, the division of load will be maintained.

Having covered the factors which determine the flow of power between prime mover generator units we still face the question of the relative amounts of power and of excitation kva, that will flow over each elementary path between any generator and any load on any given power system, even with the generation and load sources fixed.

The factors which control this situation are these:

Knowing (1) the terminal voltage (both in magnitude and vector position) of each generator, (2) its output (both in kilowatts and excitation kva.), (3) the corresponding voltage and input (in power and excitation kva.) for each load, and (4) the complete interconnections (both in geometric configuration and as to electrical constants for each elementary section of the interconnecting system) the power flow in each elementary section must be such that, starting at any point in the network and going to any other point in the network, the voltage at the new point equals the voltage at the starting point plus the summated line regulation over the path taken.

Plainly, the mathematical solution of this general problem is the old solution of a mesh and involves nothing more in principle than the writing and solving of the necessary simultaneous vector equations. The practical difficulty in the situation is that as soon as the mesh is at all complicated, and in practice nearly all meshes are, the labor involved in the above method is so great as virtually preclude solution.

Thus, this type of problem, which is commonly termed a load study, has become one of the regular reasons for using an a.c. calculating table. With this device, the solution becomes a simple procedure, and the results are obtained quickly and accurately.

As can now be visualized, any mechanism for changing the voltage drop over any element on the system under question will change the relative flow of kilowatts and excitation kva. over the different paths in that system.

In general, decreasing the angle between generator and load volts over any path with respect to another path tends to increase the kilowatt flow in that path. In distinction to this, any increase in voltage magnitude without change of angle tends to increase excitation kva. flow of that path. These two statements are, however, but generalities, for it immediately can be seen that their accuracy depends upon the vector angle between the voltage boost applied and the regulation drop of the line, which in turn controlled by the power factor of that particular circuit.

Referring to power flow, in any situation where one increases the power output from a prime mover unit by increasing flow to the prime mover itself, the thing that happens is that the increased output of the prime mover momentarily speeds up the rotor on the alternator. This advance in the rotor position produces an advance, with respect to time, in the voltage generated. Thus, putting more power into the prime mover increases the angle between generator and load voltage. This increase in voltage angle produces the added electrical output from generator to load to balance the increased output of the prime mover.

Suppose that there are two circuits connecting a generator and a general load area and, for easy visualization, let's assume that the load is unity power factor and that half the load is being carried by each circuit. This, of course, would be true if the circuits started on a common bus and ended on a common bus and had equivalent impedances. Next, suppose that a feeder reactor is installed in one of the two circuits. The presence of this feeder reactor would mean that if the same power flow could be maintained over that circuit the voltage angle between the two ends of the circuit would be increased by the presence of the feeder reactor.

This characteristic of the feeder reactor, whereby it increases the regulation angle between the two ends of the line for a given power flow, will result in a lesser power flow over the line. In other words, it will take a lesser power flow to give the same regulation drop over this line with its higher impedence than it will over the other line. Thus, any change in the constants of one of several parallelling circuits, such that the voltage angle between the two ends of the circuit will be increased at a given power flow, will decrease the power flow over that line. If a voltage-angle boost

were somehow injected into this circuit instead of the voltage drop produced by the reactor, then more power would flow over the line.

Where can phase-angle control be applied?

Applying phase-angle control to a circuit is essentially the same thing as applying a step-voltage regulator, except that the angle at which the voltage boost is applied is something other than in-phase. Step-voltage regulation, either in-phase or out-of-phase, can be accomplished in two general ways.

First, transformers can be built, with series windings to be connected in the three conductors of a circuit, with the proper secondary windings to be excited from some available source and with a means of control so that this excitation can be varied in magnitude, thus controlling the amount of boost voltage produced in the series windings. Of course, as a last practical refinement, this excitation is normally arranged to be reversed, so that both boost and buck can be obtained.

It is plain that the angle at which this voltage boost is produced will depend on the supply voltage which is used to excite this boosting transformer and on the connection arrangement of its low tension windings.

For the above purpose a unit can be built up as a separate transformer in its own case or can be installed, as a separate transformer within the case of some larger transformer bank which is itself connected in the same circuit as the one to which the boosting transformer is to be applied. This combining of the two units in the same tank, of course, cuts down the total number of bushings required, as separate bushings are not needed in this case for the series windings themselves.

The other general arrangement for producing a step-voltage regulator is applicable only when we have a power transformer bank to start with. A voltage corresponding to that normally generated in one phase of a transformer can be added vectorially to the voltage in the main windings of some other phase. On this basis, in a Y-winding, for instance, it would be possible to add a voltage at 60° to the main voltage in each winding. In this case, as in the previous one, some means would have to be provided for varying the amount of voltage in the series winding if it were desired to control it. There also are occasional situations in which it is desired to put a definite voltage shift in a circuit and then in addition a variable shift. On such a basis both the fixed and the variable voltages might be obtained by either of the above general procedures, or one of the two voltages might be obtained by one procedure and the other voltage by the other procedure.

Thus, voltage regulation of some kind, in-phase or out-of-phase, can be produced in connection with any kind of a power transformer bank and it also can be produced without any power transformer bank being present In other words, the best solution of any job is a matter of detailed study, and there is no standard practice which will indicate ahead of time the precise approach which the transformer designer will use on a particular problem.

Costs

The cost of this load-ratio control mechanism assembly is not proportional to the kva. rating of the regulating unit, but costs a great deal more per kva. on small units than on large units. In addition, the cost of the regulating windings themselves increases with capacity in the same general way that the costs of all transformers go up with capacity. Thus, it should be apparent that the percentage increase for adding regulation to a power bank will be higher for a given per cent regulation on a bank of small kva. capacity than it would be on a bank of high kva. capacity. In addition, the cost of the regulation equipment on a bank of any given capacity will of necessity increase with the percent regulation desired.

In translating the above reasoning into the angle-control unit, one further factor should be kept in mind. If the regulating winding is arranged to produce a voltage at right angles to the main winding, then the kva. capacity of the boosting winding divided by the kva. capacity of the main winding of the transformer will be the tangent of the angle of voltage shift produced. On this basis it is apparent that as the voltage-shift angle is increased the additional kva., required in the boosting winding to produce each degree of shift angle, increases rapidly. Thus, the cost of obtaining voltage shift of excessive magnitude becomes prohibitive.

Can phase-angle and voltage control be put on some transformer?

I believe it is plain from the foregoing that in-phase and out-of-phase voltage control can be provided in any circuit. As above explained, it will be a matter of individual design analysis to determine whether one or both of these voltage controls should be incorporated in the power bank or external in a separate regulating unit.

What is maximum angle obtainable?

There is no such thing as a fixed economic limit for phase shift. It obeys, as above explained, the law of diminishing returns, and it is purely a question of deciding how much one can afford to spend for it in each case.

What is the maximum number of steps obtainable?

I don't believe we have ever built a phase shifting unit that required more steps than provided by the standard 16-step unit. The precise answer, however, to how many steps one should have in any case can be obtained by calculating that case and determining the exact amount of load shift that would be obtained for any given size of step throughout the shift range.

Synchronous Condensers

Synchronous condensers can be used to vary the amount of wattless flow over a circuit and, therefore, can effect the voltage regulation drop over that circuit.

Suppose we take the simple case of a circuit which is all reactance, and most circuits are predominantly reactance, and one which has a power flow at unity power factor. If, by the use of a condenser on this circuit, leading or lagging, wattless is added, the added regulation drop of this wattless through reactance will be directly in-phase with the voltage on the circuit. This modification would result in practically no shift in the voltage angle and, therefore, no change in the power flow.

In other words, in this special circuit. the voltage-regulation changes produced by varying the wattless component on the circuit-power flow through the use of a synchronous condenser would be similar to those produced by a single-phase voltage regulator, a step-voltage regulator, or ordinary load-ratio control in that these voltage changes would be in phase with the circuit voltage. It is common experience that practically no power shift can be obtained with these devices.

In the practical circuit which has resistance as well as reactance, the synchronous condenser can produce a voltage shift that does change the voltage angle, therefore can shift some power, but on the ordinary circuit the power shift that it can produce is so small in proportion to the wattless change required to produce it that the synchronous condenser in general is of little use in really controlling power flow. Its use is in control of wattless and through modification of the wattless flow in control of voltage magnitude not angle.

NORTHWEST ASSN. REPORT

This is one of the papers presented by the systems engineering sub-committee of the Electric Equipment Committee (J. Hellenthal, chairman) at the 1940 meeting of the Engineering & Operation Section, Northwest Electric Light & Power Assn. J. F. Spease is with General Electric Co.

Is Engineering's Heyday Past?

"Not on your life," say Northwest engineers; 6-min. summary of a year

SOON after morning trains pulled into Spokane, April 10, a long line began to form at the registration desk of Spokane's famous Davenport Hotel. The trains had hauled in several carloads of electrical engineers. More had arrived by auto. All were ready for a convention.

That was Wednesday morning. By Friday, 175 had registered, making up the delegation to the seventeenth annual general meeting of the Engineering and Operation Section, Northwest Electric Light & Power Assn.

Washington Water Power Co. was host, with Chief Host Harry Collins (chairman of arrangements) shepherding delegates to appropriate meetings and on an assortment of inspection trips. Besides, WWP's vice-president and general manager—J. E. E. Royer—is president of the Association, and as such delivered the opening address.

Point of his message was that the future will put ever increasing responsibilities on electrical engineers in the Northwest. He pointed to the federal plants which will affect nearly every electric system in the Nortwhest. He emphasized that established utilities must accept cooperative responsibility in marketing this power. He indicated how this will require the best performance of every employee. And since, as he said, "the government cannot by edict create an Edison or a "Steinmetz," the responsibility for fresh contributions will remain in the future as in the past, strictly with the individual engineer.

From that point, Engineering Section Chairman Paul P. Ashworth, of Telluride Power, took over. Delegates went to work on a three-day series of sessions, and proceeded to demonstrate, with an assortment of 33 technical papers on engineering and operating problems, that ingenuity is at work.

ELECTRICAL WEST for June will carry a complete index to the Northwest Assn. reports and most of the reports themselves. The following, however, indicates the scope of work undertaken at the Davenport Hotel.

Accidents

Reported on company experience, discussed methods of improvement. Turned in first comprehensive study of vehicle drivers, traffic accidents, showing increased vehicle miles but decreased accidents. Made annual report personal injuries, both frequency and severity being down. Saw pole-top resuscitation demonstrated.

Utilization

Three papers covered highway lighting one rounding up experience with operation and maintenance costs, another describing G-E's new evaluator. Viewed the fluorescent-lighting field, finding it reasonably healthy, with power factor fairly well under control. Heard a report on the performance of various water-heater-tank materials; another on miscellaneous appliances which concluded that revenue loss through higher efficiencies of modern units is serious enough to furnish an incentive for finding new uses.

Production

Discussed steam production and general problems briefly but dealt mainly with hydro maintenance, discussing protective coatings and, more intensively, techniques with metal sprays.

Equipment

Two reports covered metering, one on new design vs. test period, tending to indicate improved design may justify extending the period; the other showed all of 11 reporting companies to be converting old meters to socket type, six of them rebuiding to higher capacities, surveyed new changes in their procedures.

Progress report on rural system planning indicated continual modernization, service improvement. Phase shifting transformers for system interconnection were explained. Reported on were: EEI's recent apparatus and design studies; the usefulness of portable substations, need for which is considered growing — units around 600 to 1,000 kva., costing, with trailer, about $10,000; factors which might be used by any company in setting up maintenance schedules for oil circuit breakers, etc.

Code

Reported on progress and on national developments; discussed 1940 revisions in electrical and safety codes.

Transmission-Distribution

Heard an analysis of eight methods of reenforcing old rural lines; discussed some possibilities through using multiconductor cables in city distribution; heard a progress report on radio interference; heard and saw the story of EEI-NEMA's standardized distribution transformers.

This transformer exhibit was taken to Spokane by Merrill DeMerit, West Penn Power, representing EEI, and Col. A. E. Herzberg, Wagner Electric, representing NEMA. Also from points east was A. B. Campbell, who summarized progress on codes.

New and welcome faces belonged to delegations from Army Engineers at Bonneville and Portland, and from the light department, City of Eugene.

Officially, the meeting ended Friday evening, April 12, with a no-speech banquet. Main event was the showing of Washington Water Power's top-notch motion picture, dramatizing electric service, which was produced by E. J. Crosby, of WWP.

Many delegates remained through the 13th, however, to visit Grand Coulee Dam, nearing the final stages of concrete pouring, and ready to receive the first electrical units, which already have been shipped. (See p. 44.)

For complete reports of Northwest engineers, read ELECTRICAL WEST's Convention-in-Print for June. (Also, see pp. 48-50, this issue.)

ALBUM OF NORTHWEST ENGINEERS

1—J. E. E. Royer, Washington Water Power, Association president.
2—Joe Siegfried and A. E. Frey, both of Pacific Power & Light.
3—Pat Murphy, G-E, and Clint Hurd, Allis Chalmers.
4—F. M. "Doc" Lewis, and P. A. Fisher, both with U. S. A. Engineers at Bonneville.
5—H. P. Currin, City of Eugene, and Harry Collins, Washington Water Power.
6—Harry Schoolfield, Pacific Power & Light.
7—A. B. Campbell, Edison Electric Institute; Merrill DeMerit, West Penn Power, representing EEI, and Paul Ashworth, Telluride power, Engineering and Operation Section chairman.
8—L. E. Emerich, Leeds & Northrup.
9—C. R. Benson, C. R. Wallis, and Jack Spease, all of G-E.
10—Malcolm Cundall, Wagner Electric, and Charlie Cutter, Pacific Electric Mfg.
11—J. R. Roberson, Puget Sound Power & Light.
12—F. S. Baldwin, Jobbers' Supply; Crit L. Woolsey, Mathias Klein; Walter Potter G-E Lamp, and Norman Arntzen, Hubbard & Co.
13—J. D. Frantz, Northwestern Electric, and J. H. Steede, BC Electric Rwy.
14—Tom Wood, Tom S. Wood Co., and A. Vilstrup, BC Electric Rwy.
15—C. J. Hawkes, Electric Storage Battery, and L. P. Joubert, U. S. A. Engineers.
16—J. W. Robinson, Leeds & Northup.
17—K. L. Howe, Westinghouse.
18—O. W. Hurd, Northwestern Electric, and F. M. Hatch, Washington Water Power.

An Album of Northwest Engineers

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Who's Afraid of Fluorescent?

Denver utility leads this new light source by the nose instead of vice versa

ONE THING can be said of fluorescent lighting in the Denver region. Nobody is afraid of it. Even with the bugaboos of power factor, load decrease, stroboscopic effect, and the many unknowns still waiting to be solved, it is being sold and sold in large hunks.

Perhaps it is the underlying philosophy of Gaylord B. Buck, general commercial manager, Public Service Co. of Colorado, that is key to it all. "If you can't lick 'em, join 'em," he says. This is a case in which he has joined fluorescent lighting, joined it in so energetic a way that it is his company that is leading fluorescent lighting by the nose, instead of vice versa.

H. T. Rankin, lighting service department manager, explains it in more detail. If the company had not decided its present course, he points out, it would be at the mercy of the itinerant cheap fixture peddler, the high pressure fixture man who uses a chisel to break in, every tinsmith who wants to make up some sort of light trough with fluorescent tube in it and who knows only one way to solicit business—cut price and lower consumption.

The alternative to that, Rankin declares, is to sell fluorescent and sell it so hard and in such quantity that the utility company sets the pace. So Public Service does set the standard. It sets it in quantity of light, in general types of fixtures sold, in power factor correction, in wattage, in supplementary incandescent lighting, in price and quality. The remainder of the industry is bound to reach up as close to that standard as it can. Jobs designed and installed by others recently in Denver and other nearby cities reflect that standard.

"Of course," says Rankin, "one thing that permits us to go as strong as we do is that we actually merchandise the lighting fixtures and sell the job and then have it installed for us by a contractor. What we sell very definitely is of a character that delivers the maximum of light, gives the customer the most for his money, and makes such an impression on the community that every other job contemplated has the previous one to shoot at as a goal."

In fact, so energetic and so thorough has been its investigation of the possibilities of fluorescent lighting that the industry naturally turns to Public Service as its source of information about it. "We feel that we have the confidence of the equipment people and local contractors and we act as a clearinghouse for data, costs, and design ideas for this new lighting," Rankin says. "As a result all the equipment now sold is that with power factor correction. We don't even talk about power factor. It isn't a serious problem with us. We do have a provision in our rate schedules for a penalty where over 2,700 watts of uncorrected lighting is installed. But we have almost no occasion to invoke it.

Above at left, interior of Cottrell's with its six lamp daylight units. At right is the entrance to a jewelry store whose windows combine fluorescent and incandescent to produce 100 ft. candles

"Some recent checks on our feeders supplying some of our major fluorescent installations have shown the power factor to be improved over what it was previous to the fluorescent lighting. The new auxiliaries have brought up the general power factor of the entire feeder.

"But you must remember that we sell a lot of incandescent lighting, too."

The approach to the customer is a very frank one. Lighting salesmen of the utility, in soliciting fluorescent lighting business, tell the customer that it has always been the company policy to get and to give as much as possible for the money. Believer in using more

efficient equipment itself where it will promote economy and give better results, the company can appreciate the desire of any business to do the same. In its own experience the company has often replaced generating and distribution equipment in order to gain higher efficiency or reduce overall cost.

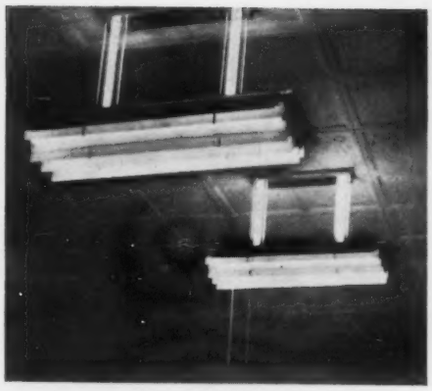
Fluorescent lighting offers the customer a similar opportunity in many respects, the salesmen tell the customer, and if the latter can use it to advantage, the utility wants him to get the benefit of it. If it results in a cut in the power bill, very well. However, the salesman warns the customer, this new light source usually whets the appetite for levels of illumination that he may always have wanted and can get now more economically. It is possible he may end up by paying more in total than he is now, but getting from twice to three times as much light for his money.

"There is no sense," the customer is told," merely to trade light sources and not get some improvement in overall lighting. If a mere change of equipment is made, you are not any better off than you were before. You won't be satisfied with just an even trade because the character of this light makes you want more.

Because there are still many adjustments to be made to fluorescent lighting equipment Rankin says that so far nearly all the fixtures sold are of local manufacture, made up especially to the company's lighting staff designs. Later on, when more of the "bugs" have been eliminated and fixtures are standardized in performance as well as certain elements of design, the nationally made and distributed equipment will be sold.

But so far there has been a need to be able to make alterations after the first trial of newly installed equipment, changes in design that experience and actual operating conditions require. If these fixtures had to be shipped back to an Eastern factory for such minor changes the cost would be high, the long distance negotiations unsatisfactory. As it is, if a new installation shows up some difficulty, it can be taken back to the local fixture plant and made to work.

Among these problems Rankin enumerates that of noise from the auxiliary, ventilation of the wiring gutter in which it is placed, direction of light, placing of louvers. So far, Public Service of Colorado has not sold fluorescent lighting with diffusing glass over the lamps. Too much light is lost, says Rankin. No glass has yet satisfied him that most of the value of higher lighting intensity possible with this light source is not absorbed in the glass and never gets to the customer.



Design of Cottrell's fixtures, four 48 in. tubes in a louvered frame, two 24 in. tubes on supports

Although the company is energetic in the sale of domestic lighting equipment, so far nothing in domestic fluorescent lighting units appeals to the company as sound. Likewise the company is studying the situation from the standpoint of voltage drop on heavily loaded residential feeders. A drop of several volts when refrigerator or other motors go on a domestic line might well be sufficient to kick out the fluorescent lamp or cause it to flutter.

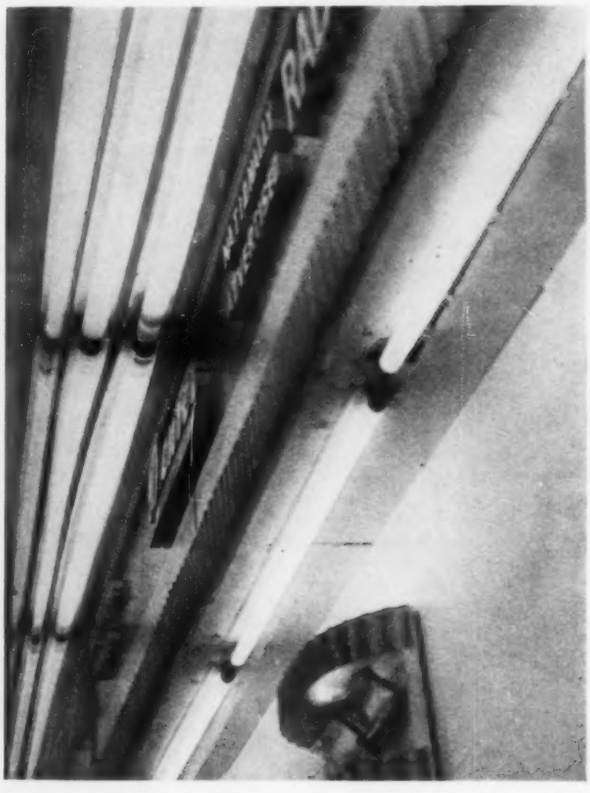
Therefore the company is going slow on domestic fluorescent lighting promotion. There are several individual jobs, however, in new homes, where conditions are right and the lighting is proving satisfactory. It is the mass selling angle of fluorescent equipment to homes that is being held in abeyance until fixtures are properly designed.

May Co. department store basement was one of the first large users. A large basement sector, its low ceiling cluttered with pipes and ducts, was used as the experimental testing ground. Previously lighted by numerous luminous bowl fixtures, suspended low and lamped below maximum in order to reduce surface brightness to tolerable conditions at eye level, the basement lighting had always been a problem. With the fluorescent lamps in simple open reflectors against the piping and spaced much closer, the level of intensity on the merchandise, the improvement in color appearance of the clothing on display, are greatly improved. The apparent brightness of the lighting fixtures to the eye, even at a low mounting height, is not as great as that of the older luminous bowls. Success of this relighting has started the May Company on a gradual relighting program for the entire store.

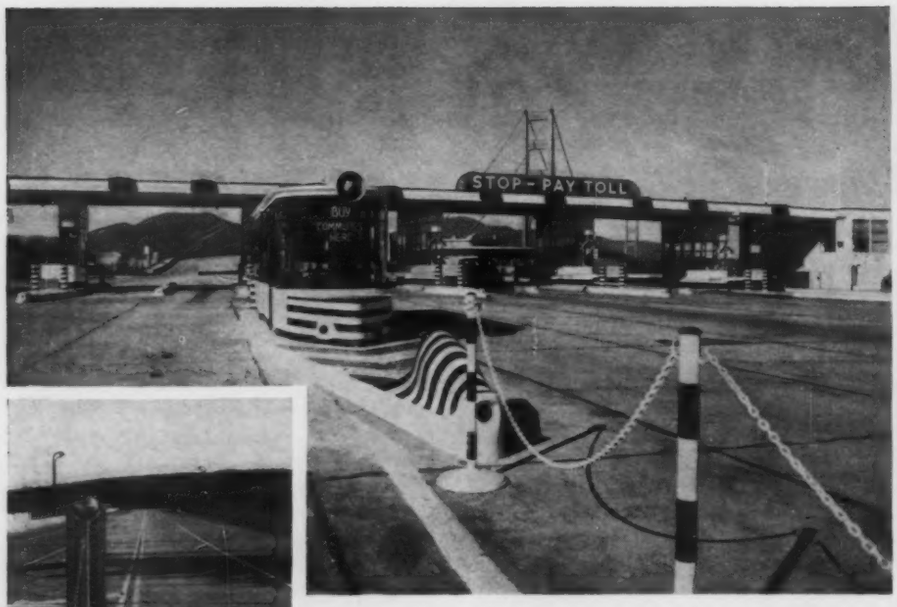
Other recent installations include relighting the main floor of Cottrell clothing store, the Walker-Buick show room, Miller Groceteria, and several banks. The latter use fluorescent lighting in the cashiers' cages and in the bookkeeping rooms.

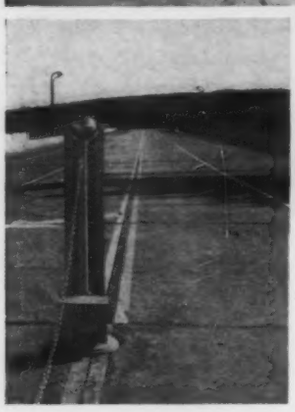
Among the most important reasons for promoting fluorescent lighting hard and fast Gaylord Buck declares is the public relations aspect of the situation. If the company were reluctant to bring this new light source to the public and foster its use, the public would find it easy to listen to whispers that the utility was afraid of it because it might cut the light bills. This would make a fertile field for the gyps and the cut-price high pressure itinerants to cultivate, and the company prestige as well as its revenues would suffer.

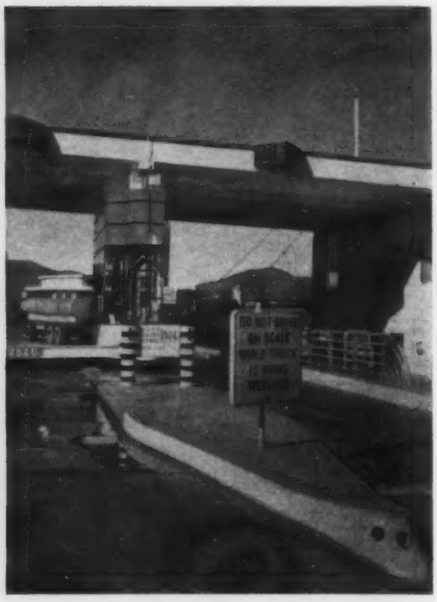
By "joining" fluorescent so aggressively that it leads the parade, Public Service of Colorado has left little room for such negative reactions and its management hopes to make this new light source a new revenue producer, a load builder from the very beginning.



Schockett Electric Co. banked three 48 in. tubes on one level, a single 48 in. tube on another, to obtain 100 ft. candles in window







First job was installation of toll plaza roof sign, "Stop—Pay Toll" and 14 neon arrows that designate which booths are open. Extreme right above, mercury 400-watt unit above booth used during bad fogs. Green fluorescent lamp was mounted over the island signs near the scales. Control for all plaza lighting is now in newly built sergeant's office at center. Changeover of toll plaza lighting control to the new sergeant's booth was made without interruption of circuits. Inset, extreme left; red flasher light for end of dividing chains, equipped with car battery in waterproof metal can

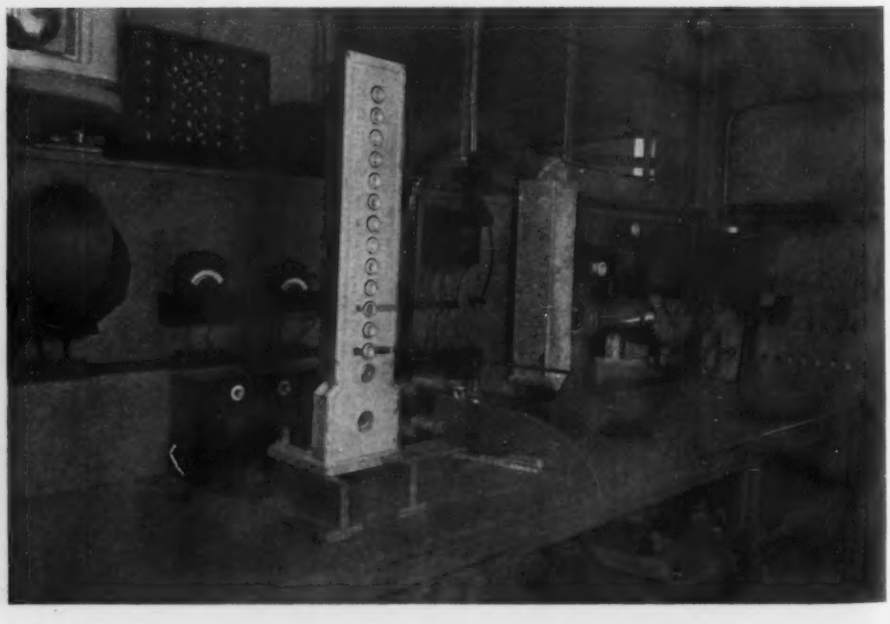
Not by Paint Alone

MAINTENANCE, at a structure such as Golden Gate bridge, is commonly thought to consist largely of repainting, but the electrical maintenance, superintended by S. J. Dickson, in charge of maintenance under Chief Engineer R. E. Cone, keeps Chief Electrician C. Edwin Porath and his crew busy at a variety of routine and construction tasks.

Beside regular checks of all original electrical equipment and keeping of accurate records of its condition, these two pages show pictorially a number of unusual jobs accomplished since the bridge opened. The maintenance crew does more than make visual inspection, oil equipment, make minor repairs, and stand watch. It makes major repairs, does some new construction and has perfected and operates testing equipment by which to check the intricate toll accounting mechanism.

When the bridge opened the maintenance crew had a work room but no benches, machinery, or special electrical facilities. Now a well-equipped shop, a testing room and a well-organized storeroom form the headquarters for the variety of maintenance duties.

Pictures and captions illustrate some of these recent achievements.

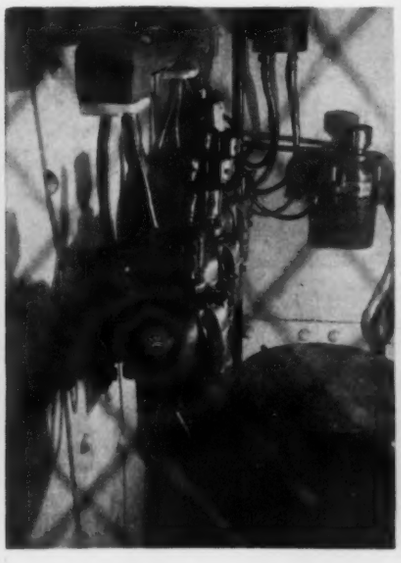


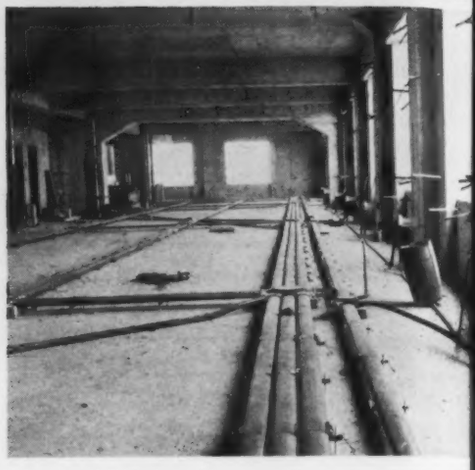
At right, testing equipment for maintenance of toll equipment and sodium lights in the shop. First system of its kind in the west, toll equipment presented a maintenance problem. Weekly testing routine covers key boxes, light signal relays, overhead and fare indicator panels and registers themselves. Periodically relays for the treadle counters and the counters themselves are removed and put on a special test rack. Test equipment duplicates that in the register room and the booth. Photo shows one of the key boxes being tested at the left. At the right end of the bench is sodium vapor lamp test rig. No longer are sodium lamps changed hot in daylight, with resultant shorter lamp life. Burnouts are checked at night and removed next day. Test rack is used to check both lamp and timing relay. Increased lamp life has resulted, one lamp burned 7,477 hrs., many over 5000

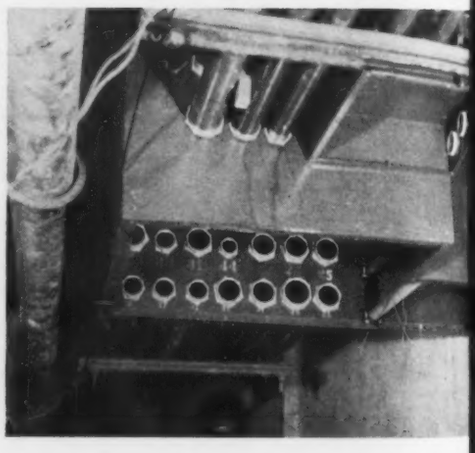
Lighting in the sergeant's booth, at left, is furnished by five 2-light 24-in. fluorescent fixtures. The color of the light serves to make the booth stand out very distinctly in the toll plaza

To furnish light at locations where original wiring was not provided, such as the new Marin facility building and pedestrian underpass, also at the gore in the road pointing either to Marina or Lombard streets, taps were made to the sodium street lighting circuits. Gardner Electric Co. built two 6.6 amp., 440-watt, 2300/120-volt transformers. Picture below shows one installed in heavy locked pull box. Protection on secondary side is with a film cutout. Bottom of page, right: Mammoth rooms in the anchorage originally had only 15 100-watt lamps. More light without changing transformer capacity was provided by removing incandescent system, replacing it with 24-in. white fluorescents to the 1½ kw. transformer capacity. These "caverns" now have sufficient light. Bottom, left, when 15 kw. was added for the restaurant at the toll plaza, this Pyranol transformer was installed there. Center: To remove hazards of porcelain cutouts ahead of the 10 transformers in the towers and anchorages, oil-filled cutouts were installed in these crowded and often damp locations.

Building the sergeant's and the commute sale booth, south of the center booth in toll plaza, called for a special feed from main basement panel to provide for a 3-kw. and a 5-kw. heater, plugs, light, 3 special 8-in. blinker lights on the bumper, speaker and public address outlets, clock outlets, and a future sign feed. From this booth operates a public address system to control traffic in the toll area, one speaker facing south on the new booth, the other the north end of the substation building. The interphone system was removed and a 2-way Voycall speaker system with a master station in the toll captain's office installed. Noninterfering, a pilot light indicates when any station is talking. Through the master station the toll captain can listen in between other masters and stations. Wires were also provided so that the toll collecting system could be interconnected between sergeant's booth and center lane booth, should occasion require. Special 2-section 10x10-in. gutter was used across the underpass to connect booths, with two 3-in. conduits from each end to the terminals in the booth. Burglar gong, and AC and DC trouble bells for burglar alarm system are located here. Also run to the new booth were public and emergency phone and control lines, a veritable switching center

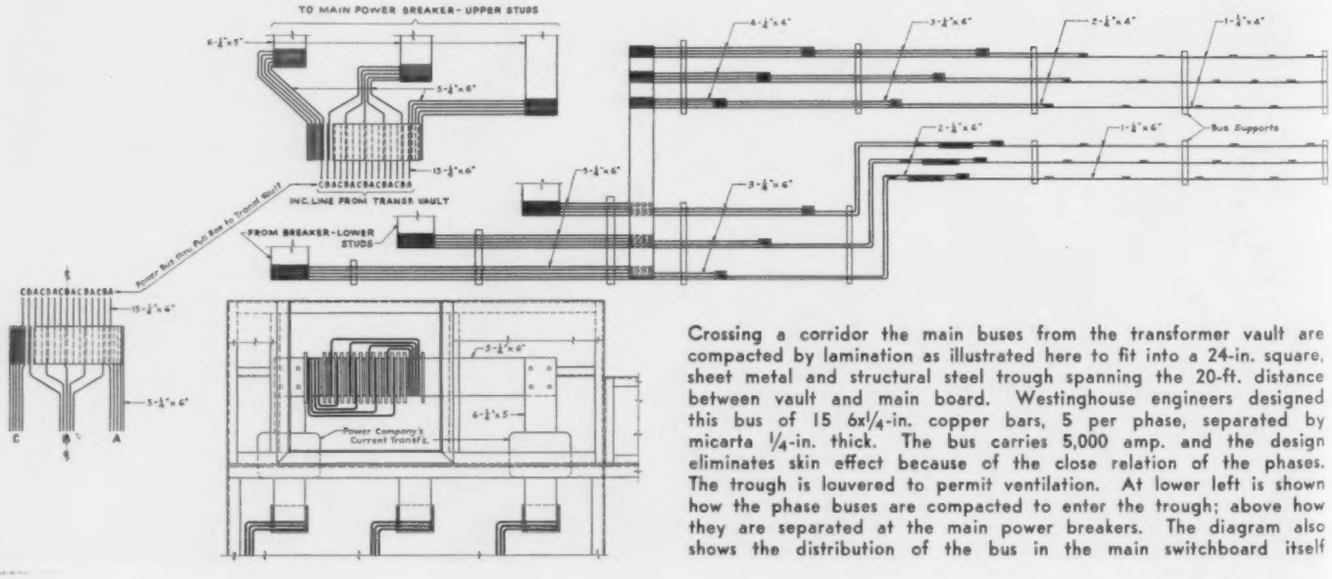






New—A Laminated Bus

BIGGER and better postoffices sprinkle the nation, but the distinguishing thing about the new Los Angeles postoffice and Federal building, even though it is one of the largest in the world, is its laminated bus bar structure diagrammed and explained below. Of its $310,000 electrical contract, including miles of wire and conduit and 102,000 ft. of fibre conduit underfloor duct, the bus arrangement makes the news, electrically. Newbery Electric Corp., Glen Arbogast, president, and Wm. Schack, vice-president and general superintendent, completed the installation not long ago. Originally 15 stories and basement, two additional stories were added after first occupancy. It was engineered for 3-phase, 4-wire operation although the network was engineered for 3-phase, 4-wire operation although the network system of the Bureau of Power & Light does not yet extend that far. An emergency lighting system for the mechanical end of the building is furnished by a gasoline engine driven, 20-kw. Westinghouse generator which goes on in three seconds after power failure and comes to full voltage in 15 sec. Pictures at the right show: flush panel lighting over the numerous writing stands in the lobby; how the fiber underfloor system was laid out on the main slab; a complex two-level pull-box with conduits numbered to distinguish circuits.



Crossing a corridor the main buses from the transformer vault are compacted by lamination as illustrated here to fit into a 24-in. square, sheet metal and structural steel trough spanning the 20-ft. distance between vault and main board. Westinghouse engineers designed this bus of 15 6x¼-in. copper bars, 5 per phase, separated by micarta ¼-in. thick. The bus carries 5,000 amp. and the design eliminates skin effect because of the close relation of the phases. The trough is louvered to permit ventilation. At lower left is shown how the phase buses are compacted to enter the trough; above how they are separated at the main power breakers. The diagram also shows the distribution of the bus in the main switchboard itself

June Brides

Newlywed promotion under way by Rocky Mountain League

June, the month of weddings, is appropriately being celebrated in Denver by the Rocky Mountain Electrical League in a unique adequate wiring, June bride promotion.

First of the 1940 demonstration homes sponsored by the Rocky Mountain Electrical League will be ready for display in May. Invitations are being sent to all those who take out marriage licenses in May. These invitations tell of the ideal home for newlyweds and invite the bride-to-be as a guest to a tea for two afternoons during the display period. Members of the women's division of the League are hostesses to these brides-to-be. A home expert is in the kitchen and gives pointers on cooking and kitchen appliances. A short talk is given on the value of I.E.S. lamps and light conditioning in the home. Another expert talks on home laundry equipment and gives ideas for saving of time and effort in the handling of this home job.

The public is also to be invited to view these demonstration homes although at different times. During such visits, a discussion of adequate wiring will be given to visitors illustrated by means of a special demonstration board. With it the builder can say "This home is adequately wired" and be able to show what that means in terms of convenience.

George Lewis, manager of the League, and John Bacon, Adequate Wiring field representative, handle the general promotion. The display and demonstrations at the home are in charge of the contractors' division of the League of which Ralph E. Johnson of Sturgeon Electric Co., is chairman.

● POLICY OF the California Industrial Accident Commission respecting the new thin wall wires was clarified by George Kimball, electrical engineer for the Commission at the March meeting, Southern California chapter, International Assn. of Electrical Inspectors at Ontario, Calif. Number of wires in the conduit cannot be increased under current California State Orders, Kimball said. The wire itself can be used when the materials are listed by Underwriters Laboratories but the present tables apply on the number of conductors permitted. Until the safety orders are revised, owners or employers may submit requests to the Commission when it is desired to increase the number of conductors in existing raceways using the new types of wires.

Philippine Prospect

"Mail the enclosed postcard" is a widely used and effective method of developing prospects through direct mail advertising. Just how effective it is was demonstrated to the commercial lighting department of the Southern California Edison Co. by the reception of a return card on a recent mailing from a business firm in the Philippine Islands.

Julian Sun Uy, proprietor of Romblon Commercial Romblon, P. I., said that he was interested in having a lighting survey made of his establishment. According to G. M. Rankin, Edison director of lighting, practically every illuminating engineer on the company's staff has volunteered to do the job, on expense account, but the latest advisement was that the company probably would pass up this prospect.

Outlets Drive

Pacific Power & Light reveals record sales by contractors

That convenience outlets can be sold by promotion has been proved for the third time by electrical contractors and the utility in southern Washington. The record for this year has just been completed by Pacific Power & Light Co., and shows almost a doubling of the number of outlets each year for the three years the campaign has been tried.

Each January the utility has put on an aggressive newspaper and bill insert advertising campaign featuring the value of additional convenience outlets. It began in 1938, and that year 57 contractors participated and reported a total of 655 double convenience outlets installed. Contractors continued the campaign into the second month, bringing the total for the two month period to 1597 double outlets.

Next January, 1939, there were 64 contractors in the campaign, and a total of 1202 double outlets were installed in the one month. This January, 1940, 70 contractors participated and 2119 double outlets were installed.

In many instances the utility's ad was supplemented with tie-in ads by the contractors, making a stronger selling drive of it. In outlining the program to contractors the utility's monthly dealer bulletin gave sales points for contractors to use in helping sell more convenience outlets.

USHA Electricity

Submetering is favored for usage on housing projects

The U. S. Housing Authority has definitely decided in favor of submetering of electricity used by housing project tenants. In nearly all projects, the local housing authority buys current wholesale and resells it to tenants. An attempt was made at first to add a flat sum for electricity to the rent, but this was found to encourage waste; USHA will in future recommend to the local authorities that metering be used.

The decision has been accelerated by the approval of USHA's technical division of several types of easy-reading meter suitable for installation where the tenant can read it. One type is the cumulative cyclometer meter recently developed by the Rural Electrification Administration. Another type has a dial calibrated in zones, set off by different colors. This latter, which costs about 75 cents more than the cyclometer type, is re-settable after reading.

An advantage of the color-dial meter is that it reflects the billing method USHA is recommending. Tenants will be charged a flat minimum rate for consumption up to a certain amount, and another flat rate for a second zone of usage.

● PG AND E have recently issued two splendid booklets on lighting, aimed to help both industrial and commercial users of electricity. "Forty Hints for Improving Sales Inexpensively" is directed toward the small store operator, telling him how his store can be improved by good light. Forty practical suggestions in the book give excellent advice on the "shopping is Seeing" theory. In the second publication entitled, "Know Your Lighting Zones of Cause and Effect" describes the zones of lighting effectiveness and efficiency, showing how adequate lighting boosts production, how glare is eliminated, and poor distribution wastes banished.

● ONE OF THE INTERESTING rewiring jobs recently completed in Vancouver, B. C., was that in the Royal Trust Building, where a new transformer vault was erected, a new 2,300-volt service, complete new high tension switching equipment, new feeders and sub feeder, new feeder switchboard, new meter control panelboards, and other equipment installed. Work was done by the Firth-Jarvis Electric Co., under the supervision of W. D. Beck, foreman. The installation was laid out by R. Lennox Mackenzie, Vancouver consulting engineer.

ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

McGRAW-HILL COMPANY OF CALIFORNIA
68 Post Street, San Francisco

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Water Heater Standardization

SOME months ago attention was called in these columns to the appalling conditions that existed in the electric water heating field whereby manufacturers were called upon to make and stock between 600 and 800 different models to meet local requirements and local specifications. Since that time electric water heater manufacturers and utilities throughout the country have taken constructive steps toward standardization of storage type water heaters for domestic use. NEMA has recently adopted standards covering many points vitally affecting the water heater model and catalog number problem. As the whole industry knows, this problem has seriously impaired efforts to reduce manufacturing and selling costs and to increase retail sales. Adoption of these new standards by the manufacturers is a move in the right direction.

However, this step alone will not solve the problem. The standards must have immediate widespread acceptance by other branches of the industry. Unless power companies and retailers endorse and accept them, the benefits of standardization will not materialize. Here in the Far West—one of the most active water heating markets in the whole country—it is especially important that the advantages of this standardization program be recognized and seized upon as quickly as possible. Such action will mean greater sales for the retailers, more load for the utilities and lower costs to the customer.

Obviously the utilities must take the leadership. It behooves them to bring the new standards to the attention of all branches of the industry and to urge that present stocks of off-standard heaters be cleared just as quickly as possible. As soon as this is done, the energy and sales effort of the whole industry can be brought to bear on the new models and sales will begin to expand.

In the meantime the manufacturers who fostered and developed the standardization program are entitled to a real vote of appreciation.

Portland PUD

THE WHOLE industry should rally around the utilities in Portland in combatting the political issue into which they have been plunged. Without marshalling the innumerable arguments which can be advanced against the PUD which will be put before the Portland voters on May 17, there is one fundamental reason for industry solidarity in actively and openly opposing this proposal. It is the danger of putting more power into the hands of government, a course which, if it is allowed to proceed, will damage the principles of liberty upon which private enterprise is founded.

There has already been built up within government what *Fortune* magazine chooses to call a fourth branch. It is a branch which is putting government into business both directly and indirectly. It is a branch which has been described as one of the major factors holding back recovery. There isn't an element in the whole electrical business but what today feels the mailed fist of some agency of this fourth branch. It would only require but a slight extension of the powers now invested in these governmental agencies to have all business completely regimented. And the next and logical step would be absolute government ownership.

So we repeat that every organization in the electrical industry in the Portland area has a vital concern in the outcome of the May 17 election. The principles involved go far beyond the issue of public ownership of an electric distribution system.

Convention Dividends

ONE OF the salutary lessons of the depression was that the elimination of industry conventions was a false economy. Business learned that personal contacts, the interchange of experi-

ence and the opportunity to build morale had more than mere intangible values—these were advantages that could be translated into improved efficiency, a harder sales drive, better customer and public relations and greater enthusiasm for the job.

These benefits are as tangible today as they ever were. For that reason it would be the greatest wisdom (though it is the height of improbability) to make arrangements to send every man and woman who could be spared from his or her job to the forthcoming PCEA convention in Oakland. The electrical industry has already invested in this convention the time, thought and labor of hundreds of its most capable people, as well as the money expended on committee work and research. A timely, cogent and informative program is assured. The only way to insure returns on this investment is in the attendance at the convention of the maximum number of people, particularly those who must put the accomplishments of the association to work in their daily tasks. Every one in the industry who can go should attend and executives of the various companies should see to it that this is possible.

Pressure on San Francisco

GANGSTERS call it "applying the heat." In diplomatic circles it is politely termed "pressure." Secretary Ickes, with the backing of the U. S. Supreme Court, says it is "the law." Voters of San Francisco eight times have said that they want no part of it. "It" in this particular instance is municipal distribution of electric power in the city, pressured by New Deal bureaucrats using disposal of Hetch Hetchy power as the club.

The Supreme Court decision invalidating the agency agreement between the city and the Pacific Gas and Electric Co. climaxes years of discussion and litigation. In the meantime the city has benefited from the $2,000,000 annual net revenue derived from power disposal since 1925. Loss of this revenue will mean an estimated 28-cent increase in a tax rate that is already near record height.

There are those public power zealots who take their cue from Secretary Ickes and insist that the only course for the city now is municipal power distribution. There is no assurance that the voters will accept such a plan, having defeated a similar one just a year ago by a 2.5 to 1 majority. Another suggestion is that a new agreement be worked out that will not violate the terms of the law under which San Francisco was given its original grant of water rights. Such a plan might work in the opinion of some legal experts.

However, the obvious course and the one which San Francisco business interests solidly back, is to seek amendment of the original Raker Act to permit the city to dispose of its power as it sees fit. There are plenty of arguments in favor of this latter proposal. The Federal government itself follows such a course at Boulder Dam, Bonneville, Casper-Alcova and in the TVA. If past elections are any criterion, it is what the people of the city themselves want. One thing should be self-evident —they do not like the pressure tactics of Secretary Ickes.

Refrigerator Deluge

AFTERMATH of the early drop in refrigerator prices has been a deluge of business. In many sections the low priced boxes cannot be supplied to the market fast enough, so great is the volume of sales. This aspect of the situation is welcome and salutary. It is filtering electric refrigerators deeply into the lower income groups of customers too. It is bringing electric refrigerator replacement on a large scale, rather than permitting so much of it to slip to competing fuels.

The chain stores are feeling it very markedly and oddly enough are the ones who are making just about the only play for the higher priced business. Finding themselves in a flood of low priced or stripped boxes they are trying to get buyers to raise their sights to the completely equipped models where they still have a strong edge over competition on price.

Dealers seem to be afraid to examine their books too carefully lest they find out that this flush of activity is like a mirage, beautiful if it were only true. They are turning over a lot of stock, but something tells them that there is a familiarity to a squirrel cage about it all—lots of turnover but no nuts—unless it is they themselves that are—.

On the eve of the roaster season these appliances too have taken a nose dive in price. Ranges, so far, have not tumbled in spite of early rumors that they might. Evidently the refrigerator situation is only catching in certain allergic cases. It would be too bad if the entire appliance market went through the uncertain experience that has the refrigeration business in a dizzy state now.

The ultimate outcome of such a situation may be a "shakedown." Those less able to survive the rigors of the combat may go under. Presumably the public benefits from a wider distribution and deeper penetration. But the real question is whether it is to its or any manufacturer's interests to benefit temporarily at the cost of business failures and disorganization. That remains to be seen in this present war of the ice cubes.

PCEA Program

Oakland prepares to play host to western electrical men

The Pacific Coast Electrical Assn. convention is raring to go. Plans and program for the May 22-24th event in Oakland are officially released, and details are given below. Committee chairmen have arranged for three days of illuminating talks, discussions and demonstrations, balanced by entertainment features that include a golf tournament, motion pictures, a bridge tournament, and a banquet and dance on the closing day of the gathering.

Headquarters will be in the Hotel Oakland, with general sessions held in the City Club Theatre. Here's how the entire convention schedule looks in print:

WEDNESDAY—MAY 22nd

A.M.—P. M. Downing, presiding
1—President's Address—W. W. Glosser
2—Address by Frank McLaughlin, President Puget Sound Power and Light Co.
3—Address by C. W. Kellogg, President Edison Electric Institute
4—Address by Joseph R. Knowland, Publisher "Oakland Tribune"
Lunch—Presiding—Clyde E. Houston, Assistant General Manager Southern California Edison Co.
Address by Mrs. Louise Ward Watkins
P.M.—Conclave Meetings (see below)

THURSDAY, MAY 23rd

A.M.—Conclave Meetings (see below)
Lunch—Past Presidents' Luncheon—Al C. Joy, Advertising Mgr. Pacific Gas & Electric Co., presiding
Address by Brewster Adams
P.M.—K. M. Ryals, Stone-Ryals Electric & Mfg. Co., presiding
1—Address by A. C. Monteith, Central Station Engineer, Westinghouse Electric & Mfg. Co.
2—"The Human Equation in Management" —Henry E. North, Vice-President Metropolitan Life Insurance Co.
3—Motion Picture—"Free Men Build a Nation," produced by United States Chamber of Commerce
4—"Research Reveals Opportunities and Responsibilities in Rural Load Building" —H. B. Walker, Division of Agricultural Engineering, Univ. of California
5—Laboratory Demonstration—R. L. Smallman, General Electric Co.
Evening—Motion pictures and Bridge Tournament

FRIDAY, MAY 24th

A.M.—W. W. Glosser, presiding
1—"Employee Training for Public Relations"—Demonstration by Pacific Telephone & Telegraph Co.
2—Address by Matthew O. Troy, Vice-President General Electric Co.
3—Lighting Demonstration, Westinghouse Electric & Mfg. Co.
4—Annual Meeting
P.M.—Golf Tournament
Evening—Banquet, Entertainment, Dance

CONCLAVE SESSIONS

Operating Economics Section

A. G. Jones, chairman
H. A. Lott, vice-chairman
Distribution, Substation and Transmission Group—A. G. Jones, presiding
Wed. 2:00-2:30—Termite Control
Speaker: C. T. Malloy
Wed. 2:30-5:00—Power Factor Correction—H. H. Minor
Speakers: C. G. Smith
H. H. Minor
H. E. Jung
Thurs. 9:00-10:30—Oil Fires in Electrical Apparatus—H. T. Sutcliffe
Speakers: F. S. Benson
R. A. Wallingford
Meter Group—Fred Garrison, presiding
Wed. 2:00-3:30—Field Testing Procedure for Single Phase Meters
Speaker: W. H. Talbott
Wed. 3:30-5:00—Five Ampere vs. Fifteen Ampere Meters
Speaker: K. M. Stevens
Thurs. 9:00-10:30—Meter Bearings
Speaker: William Lindblad
Steam Generation Group—V. F. Estcourt, presiding
Wed. 2:00-5:00—Roundtable Discussion
Thurs. 9:00-10:30—Continuation of Roundtable Discussion
Hydro Generation Group—George H. Bragg, presiding
Wed. 2:00-5:00—Roundtable Discussion
Thurs. 9:00-10:30—Continuation of Roundtable Discussion
Safety Committee—Howard Miller, Chairman
Wed. 2:00-5:00
1—The effect of electrical shock on the human body
2—The use of counter-shock in resuscitation from electric shock
3—The use of oxygen or carbogen in resuscitation from electric shock
4—The pole-top method of resuscitation for linemen
5—The Larson method of artificial respiration
Thurs. 9:00-10:30—Continuation of Discussion
Motion Picture Demonstration of Pole-top Method
General Assembly of Operating Economics Section—A. G. Jones, presiding
Thurs. 10:30-11:30—Lightning Protection from an Economic Standpoint
Speakers: W. C. Smith, A. F. Ayres
Thurs. 11:30-12:00—Report and Exhibit of Standards for Distribution Transformers Prepared by a Joint Committee of EEI and NEMA.
Speakers:

Business Development Section

F. C. Todt, chairman
E. G. Stahl, vice-chairman
Wed. 2:00-5:00—Wiring Group—J. O. Dillingham and C. A. Rowley, presiding
1—Report of Standardized Services Committee, C. A. Rowley, chairman
2—Report of Red Seal Adequate Wiring Committee
3—Report of Code and Ordinance Committee
4—Report of Demand and Diversity Factor Committee—C. E. Heise, Chairman
5—Discussion of New National Electric Code Provisions
Lighting Group—L. A. Hobbs and G. M. Rankin, presiding
Wed. P.M. 2:00-2:40—"Illuminating Design for Self-Service Stores"
Speaker—George Killeard, Stanford Univ.
2:40-3:20—"Light Conditioning in the Home"
Speaker—Clark Baker
3:20-4:00—"Western Lighting Opportunities"
Speaker—H. N. Carroll
4:00-5:00—"Problems Incident to Fluorescent Lighting." Speakers—William P. Bear and Walter E. Carlson
Thurs. A.M.—"Lighting for Outdoor Sports"
Speaker—J. E. Hammond
Range, Water Heater & Air Heater Committee, W. H. Gribble, chairman
1—Report on Committee Survey
2—NEMA Proposals for Standardizing Electrical Water Heaters
Speaker: E. J. Baughman
Refrigerator and Traffic Appliance Group—O. R. Doerr and H. C. Rice, presiding
Power Group—W. P. L'Hommedieu and P. P. Pine, presiding
Industrial Power and Heating Committee—G. N. Hawley, chairman
Subcommittee on Data Sheets—J. A. Corlett: Subcommittee on Welder Ratings—C. L. Ashley; Subcommittee on Competitive Power—S. A. Cundiff
Electric Refrigerators
1—Price trends and their effect upon sales
2—Trade-in Problems
3—Developments in Promotional Methods
4—Distribution Channels
5—Sale of Used Refrigerators
Discussion leaders: Clyde Allen, Robert Thompson, Wm. Vogel.
Traffic Appliances
1—Promotional activities
(a) Needs
(b) Methods
(c) Customer Canvass
Discussion leaders: Miss Gladys Cronkhite, A. H. Dahl, H. E. Sandoval
Financing Small Balances
Speaker: F. E. Yerger, Bank of America
Air Conditioning Committee—H. H. Douglas, Chairman
Thurs. 9:00-10:00—Continuation of Committee and Group Meetings
Highway Lighting Committee—R. E. Fisher, chairman
Technical Subcommittee, Wm. P. Bear, chairman
Thurs. 10:00-12:00—General Assembly of Business Development Section—E. G. Stahl, presiding
1—"Fluorescent Lighting and the Utility"
Speaker: Wm. P. Bear
2—Speaker: John R. Pitsker, "Housing"
3—"Your Customer Speaks"
Speaker: Samuel F. Worswick

Administrative Service Section

W. M. Phillips, chairman
E. A. Long, vice-chairman
Wed. 2:00-5:00—Transportation Committee—P. H. Ducker, chairman
Purchasing and Stores Committee—E. P. Hanson, chairman
Accounting Group—L. W. Coughlan, sponsor
1—Handling of Replacement of Minor Items of Plant
2—Accounting for Depreciation
Discussion Leader: R. N. Dreiman
3—Accounting in Connection with Sale of Load Building; Appliances to Customers
Discussion Leader: Harry McGann
Credit and Collections Group—Charles Davies
Joint Meeting, Customer Relations Group
Customer Relations Group—C. E. Hewes
Joint Meeting, Credit and Collections Group
"Customer Relations as Affected by Credits and Collections Routine"
Credits
1—Application for Service
2—Establishment of Credit
3—Taking and Refunding of Deposits
4—Credit Classification of Customers
Collections
1—Current Accounts
2—Closing Accounts
3—Meter Corrections
Discussion leaders: P. E. Thomson, K. L. Boosey, A. L. Code, Charles Davies
Thurs. 9:00-12:00—General Assembly of Administrative Services Section—M. W. Phillips, presiding
Symposium of Paper on Subject: "Selection, Training, and Advancement of Employees"—S. W. Scarfe, sponsor
Thurs. 6:00 p. m.—Women's Committee—Mrs. Eleanor Gemmell, chairman dinner meeting

Above—The Edgewood Hills and Edge Moor Terrace Developments, Wilmington, Delaware, have two hundred residences, ranging in price from $5990 to $25,000. All of the homes were sold *before completion* and 156 additional ones in the $5990 class are being built immediately. The Wilmington Construction Company is the builder and owner.

At left—Mr. Frank Briggs, (center), the electrical contractor and his assistants.

Contractor Briggs got this Job with

SQUARE D MULTI-BREAKERs

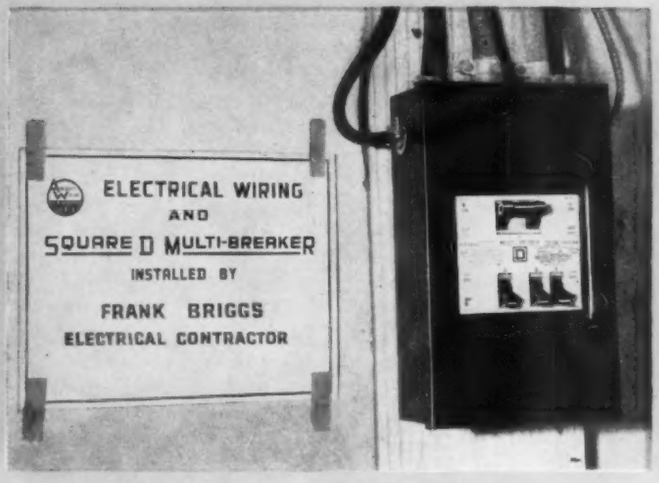
Here is a job any electrical contractor can be proud to claim—200 homes and 156 more to come! And Mr. Briggs goes on record to the effect that "the recommendation of using Square D Multi-breakeRs had a lot to do with my landing the job."

Every home in this development will enjoy Multi-breakeR convenience and protection. The smaller ones are wired with 3 and 4 circuit Multi-breakeRs, with the exception of some, where a range circuit has been provided. The larger homes have 6, 8 and 10 circuit load centers.

Mr. Briggs knew, from experience, that the builder would profit by Multi-breakeR installations. And the Wilmington Construction Company, having seen the Multi-breakeR play a real part in the immediate sale of these homes, heartily agrees with him.

Multi-breakeRs will help *you* get more and better wiring jobs. See your Square D distributor or write for Bulletin CA-543.

CALL IN A SQUARE D MAN



A typical Multi-breakeR installation in one of the smaller unfinished homes in the Edge Moor Terrace Development. Multi-breakeRs seldom add to the total wiring cost—in many cases actually cost less than the switch and fuse equipment they replace.

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

Contractors

Stockton convention given preview of new code

A FORETASTE of the disgust and confusion which may come with the 1940 Code was given to the Electrical Contractors Assn. of Northern California at its annual meeting, Hotel Stockton, Stockton, Calif., Apr. 20. Also explained were a programful of subjects—voltage drop tests that are making new rewiring business in office buildings; plans of the Contractors' License Board to set up real prequalification before granting new contractors licenses; Federal indictments of contractors and what the cases are about; and an assortment of other timely topics. President Ken Ryals, Stone-Ryals Electric Co., San Francisco, presided.

Rolly Goold, Eddy Electric Co., Stockton, vice-president, opened the meeting because Ryals and a party of contractors coming into Stockton by launch had been delayed by a frozen bearing. Mayor Cole of Stockton welcomed the delegations totalling more than 75 from Fresno, Sacramento, Marin County, Santa Cruz, Palo Alto, San Mateo, Oakland and San Francisco.

How the Pacific Coast Electrical Bureau, Northern Division is working to create business for contractors by means of its adequate wiring program, its building modernization activity, its advertising and the lighting and wiring classes it is holding in conjunction with apprentice training, was told by George Barker, its manager. He then introduced the Bureau's industrial engineer, Walter Heston, who gave a demonstration of the testing rig with which he visually demonstrates to a building owner or manager the voltage conditions in his own building and computes for him the actual dollar losses, not only in lamp brightness, but in heat wasted.

It was then that Ralph W. Wiley, chief, Department of Electricity, San Francisco, and a member of the Electrical Committee, (which makes the National Electrical Code) gave a foretaste of things to come in wiring rules. Describing first the procedure of the Electrical Committee, its group make up and their political axes to grind, he was able to set up a background of the pulling and tugging of various interests who wish to admit new materials or deny their admission, and an overriding growth in complexity in the entire code. The new tables of wire carrying capacities, based on recent new tests, are particularly complicated. For the first time the ambient temperature is to be taken into account, and contractors and journeymen, he said, may have to go about with a kit of thermometers, and inspectors follow up with another batch to check up on them, before deciding what wire to pull in.

Wiley then told of the new thin-wall wires of several types and the increases in carrying capacity which can be made in existing conduits by replacing old wires with new. Tables of these possibilities are to be furnished to members of the association through the courtesy of Wiley and Harold Gerber, chief inspector of San Francisco.

Nicholas J. Morrisey, deputy registrar of the California state Contractors License Board announced for the first

Retiring president Ken Ryals of San Francisco congratulates new president Grover Grider of Stockton upon his election to the office

time the proposed examination procedure by which applicants for a contractors license will be qualified. Present requirements are designed only to check into the financial responsibility and business knowledge of an applicant. New examinations will soon require a test of the applicant's technical knowledge and will serve to restrict his contracting to fields in which he knows his business.

Even in renewing of licenses this year, Morrisey explained, contractors will be asked to state in what fields at least 51% of their business is done. Those wishing to contract in other lines than their own will then be asked to qualify in the same way as a new applicant.

In comment that followed, contractors viewed this with considerable pleasure. They hoped that it would stop general contractors from taking big electrical installation contracts

Meetings will be held, Morrisey announced, similar to those held when the state safety orders were prepared, at which members of a contracting branch will advise the board as to the examination requirements necessary to prove technical ability.

The Federal indictments against several groups of California electrical contractors in the government's drive on the building industry, was the main topic of discussion at the afternoon session. Letters were read from Walter J. Walsh, attorney for the contractors, and from Laurence W. Davis, managing director of National Electrical Contractors Assn. Attorney Walsh contended that the contractors' association, organized under the Unfair Trade Act of California, was out of the jursidiction of the Sherman act. Davis' letter told of conferences between NECA and the Department of Justice looking toward the review of contractor organization procedure to permit such corrections of trade abuses as are possible under the law.

Until the San Francisco case goes to court, it was shown, the definite situation as far as interpretation of intra-state, vs. inter-state business will not be known. Upon this seems to hinge the future of the indictments.

Clyde L. Chamblin, representative from Div. 9 on the labor relations board of NECA, emphasized again the growing importance to contractors of having a national negotiating board to represent them in labor relations, particularly in view of threatening aspects of conflict between AFL and CIO.

Further study of the possibilities of dealing with unethical competition through use of the Unfair Trade Act was recommended. A committee is to investigate the subject. Other subjects referred to active committees for immediate action were those of direct sale of materials to industrials, asked-for wage increases in Contra Costa county, counteraction to a reported program of Los Angeles business interests which are attempting to have those cities whose ordinances now require Underwriters' listed materials accept the tests of the Los Angeles city testing laboratories instead on products made in that city.

Before election of officers the constitution was amended to increase the number on the executive board to 12 to give a wider representation from all sections of northern California. Rolly Goold, of Eddy Electric Co., Stockton, vice-president during the past year, resigned his place as the logical candidate for presidency to Grover Grider, of Stockton. Grider was elected president; Dan Bronson, California Electric Co., Oakland, vice-president; W. A. Cyr, ELECTRICAL WEST, secretary and treasurer, and to the executive board, C. S. Donley, Sacramento; Ted Curry, Fresno; Roy Butcher, San Jose; Seth Cohn, San Mateo; B. A. Solomon, Monterey; Carl Severin, San Francisco; and Harry Eklund, San Rafael.

Oakland was voted the place to hold the next meeting in early fall.

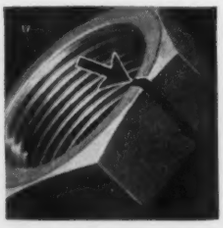
READ HERE—HOW KEARNEY CON-NEC-TITES ARE MADE BY A SPECIAL PROCESS TO AVOID SEAM CRACKS

UNIFORM BALANCED DESIGN

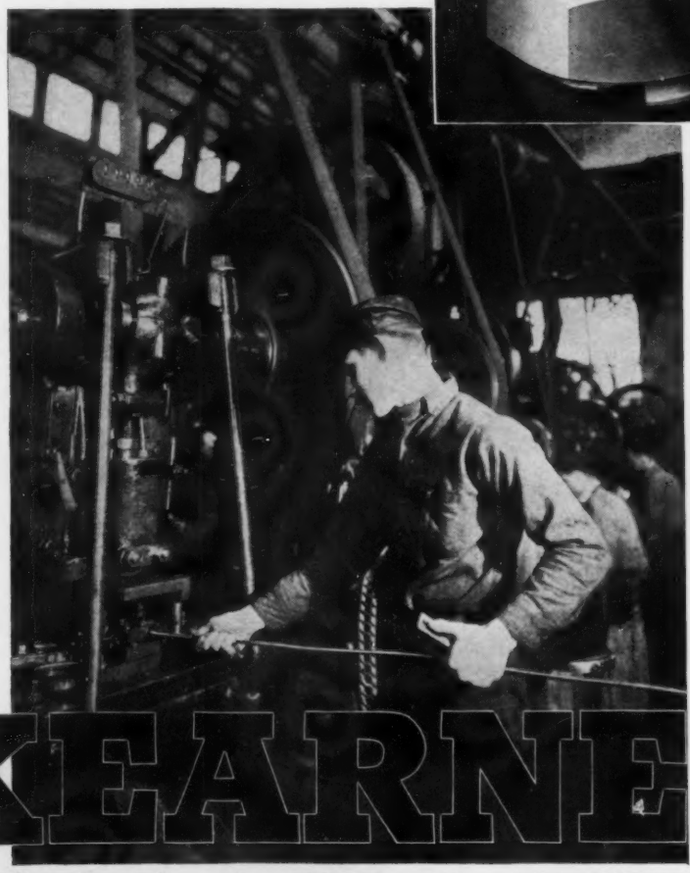
A HIDDEN seam crack in the nut of a solderless wire connector, after it has long been in service, and expansion and contraction has set in, might develop into a definite split and become a source of costly trouble. But seam cracks in Kearney Con-Nec-Tites have been avoided and minimized by study and research conducted years ago when the Kearney Corporation alone was pioneering the use and advantages of this method of making good electrical connections, without hazardous use of solder.

An initial step to avoid seam cracks was to conduct a metallurgical survey to determine best materials for strength and lasting qualities. The next step was to develop a special exclusive process of fabricating rod stock into Con-Nec-Tite nuts — a process that requires three separate conditioning operations. A third step was the establishment of rigid inspection methods to catch seam cracks before they appeared in Con-Nec-Tites.

Naturally, these extra manufacturing precautions placed added costs on production of Kearney Con-Nec-Tites — but streamline manufacturing methods and large volumes have offset these costs and enables you to get extra value, at no greater cost.



Operating men who have used Kearney Con-Nec-Tites for years will tell you that it pays to use Kearney quality to obtain greater line security.



Use KEARNEY CON-NEC-TITES

EXCLUSIVE SALES REPRESENTATIVES MAYDWELL & HARTZELL INCORPORATED

LOS ANGELES • SAN FRANCISCO • PORTLAND • SEATTLE • PHOENIX • RENO • TACOMA • SPOKANE

IAEI Plans

Southwestern Section to gather at Santa Barbara Aug. 26-28

Hotel Miramar in the Montecito district of Santa Barbara has been selected as the convention spot for the Southwestern Section, International Assn., of Electrical Inspectors. Held earlier this year, August 26 to 28, the location promises it to be popular since it is near the beach and in a garden surrounding.

According to H. L. Gerber, secretary-treasurer of the Association, all activities of the convention will be centered in the one cottage hotel. This will include the business session, the exhibits, the dinner dance, as well as recreations such as golf, horseback riding, swimming, etc.

Committees as yet have not been named for the various activities. The program contemplates that most of the time will be devoted to a thorough discussion of the 1940 addition of the National Electric Code which should possibly be out at the time of the meeting. However, since no inspectors will have had an opportunity to study the new addition, it is unlikely that there will be any new committee report suggesting other changes to the Code.

The members of the executive council and members of the Electrical Committee NSTA code making body, will be asked to explain passages in the new Code so that more uniform interpretation may be had.

Rates at the hotel are said to be reasonable and an ideal vacation combination with the convention is available.

Agenda

Associations throughout the West report doings

Interesting programs, luncheon meetings to conventions are on the schedule of electrical leagues and clubs for the coming months. Their past activity is noted here, too:

American Society Heating & Ventilating Engineers, Golden Gate chapter, San Francisco, met April 9 to hear Gean A. Brown, U. S. Dept. of Agriculture, speak on Air-Way Weather Service. G. M. Simonson is president of this group; Jaree A. Hill, secretary.

Electrical Estimators, Los Angeles, met April 18 to hear Bill Comyns report on South American experiences. John Strickley is secretary. Club employs unique announcement in form of telegram from Frank Wiggins Trade School.

EMEA of Southern California gathered April 16 for dinner meeting. Mabel M. Rockwell, formerly Southern Calif. Edison and now of Lockheed Aircraft as a production research engineer, discussed "Research and Development in the Aircraft Industry."

I.A.E.I. Southern California Chapter. According to custom the annual May meeting is to be held at Long Beach, May 22. Inspectors problems discussion leaders will be Jack Crannell, Glendale, Fred Vore, Pasadena, Frank McMahon, Pomona, W. Treathaway, Huntington Park, O. D. Butterfield, Torrance, and W. T. Phillips, San Gabriel, Harley Stewart, Southern California Edison Co., and Joe Rose, Bureau of Power and Light, Los Angeles are to report results of an investigation into water seepage in service conductors, service heads and meter sockets during storms. Last meeting in March at Ontario was attended by 67. W. O. Packard, Santa Ana, section chairman, presided.

IAEI, southwestern section, San Francisco —Northern California chapter meeting held April 24 in Oakland. Discussed installation and construction of fluorescent lighting. Harold L. Gerber is secretary-treasurer.

IAEI, Salt Lake chapter—C. F. Grant, asst. foreman Meter Dept., Utah Power & Light, spoke on "Meters, their Types and Uses." L. B. Johnson, General Electric, was speaker at March 19 meeting, and gave an illustrated lecture on safety devices.

IES, San Francisco Bay Cities Section—Met April 11 to heard Ed Whitehead, General Electric Co. speak on new highway lighting evaluator. John D. Erikson, secretary.

NECA, Santa Barbara chapter — Arthur Kempston, Electrical Development League of southern California, spoke at a recent meeting on "Selling and Salesmanship" and made plans to start salesmanship class. Meetings were held April 11 and 25, and are scheduled for May 9 and 23.

Rocky Mountain Electrical League—Engineering and Accounting divisions met April 15-16 at luncheon meeting in Denver. L. W. W. Morrow, editorial director, Electrical World, addressed the gathering. H. T. Rankin, was chairman of the Lighting Division; Murray Graff, chairman of Street and Highway Lighting committee. J. B. Johnson, G-E Co. and chairman of the Adequate Wiring committee of the Electrical League of Utah, addressed 78 architects at a dinner meeting of the League's Adequate Wiring Bureau.

Electric Club of San Diego—Met April 2 to see motion picture presented by Arnold M. Skudre, Submarine Signal Co., assisted by J. L. Lovett, "Tuna Fishing with an Echo Sounder." Chairman of day was Bob Redfield, Graybar Electric Co. Ray Edward, San Diego Consolidated Gas & Electric Co., arranged a program on April 9 with Richard Brackenbury, who talked on "24 Hours with the Roundup." "Blame It on Love," the popular Hotpoint commercial picture starring leading Hollywood players was presented by Harold G. Conklin, Hotpoint Pacific Coast salesmanager with E. W. Meise, chairman.

Electric Club of Washington—At April 1 meeting, Lewis A. Corbett, manager of Seattle office, Washington State Unemployment Compensation and Employment Service Bureau, spoke on the details of his work. H. E. Jamison, Seattle "Star," presented "Waterfront Stories" April 8, while on April 15 Ray Murray, bridge engineer for Washington State Bridge Control Authority, gave an illustrated talk on the Lake Washington Floating Bridge.

ANNUAL LEAGUE DAY of the Electrical Development League of Southern California was staged recently before a goodly gathering of electrical men at the Electric Club. H. D. Conklin, president of the League for 1940, and manager of Pacific Southwest district for Hotpoint, reviews here the birth, activity and development of the League since its formation in 1935 by the Electrical Club. Conklin cited the work of the League's Domestic Appliance, Industrial Power and Heating, Commercial and Industrial Lighting and Adequate Wiring Committees. First officers of the League were M. S. Sues, president; A. E. Hitchener, vice-president, and A. L. Stone, secretary-treasurer. F. L. Hockensmith has been gen. mgr. of the League since 1935

QUALITY PERFORMANCE

IN PITTSFIELD WORKS LABORATORY

WE STUDY OLIGODYNAMIC* ACTION

NO ONE ever heard of a distribution transformer failing because of the carbon content in the core steel. But the carbon can be disastrous to distribution economy just the same. Minute percentages of it can materially affect the core loss.

Knowing this, G-E engineers have set up a "carbon determinator" in the laboratory of the Pittsfield Works, where distribution transformers are made. This determinator, which measures as little as 1/1000 of one per cent carbon in steel, is used as a control to evaluate the processes in the manufacture of core steel.

The carbon determinator is just one example of the laboratory facilities regularly used in the design and manufacture of G-E distribution transformers. The painstaking care that such facilities represent isn't something that can be written into specifications. It *is* your assurance of obtaining full value when you purchase G-E distribution transformers.

**Oligodynamic—the effect produced by small quantities*

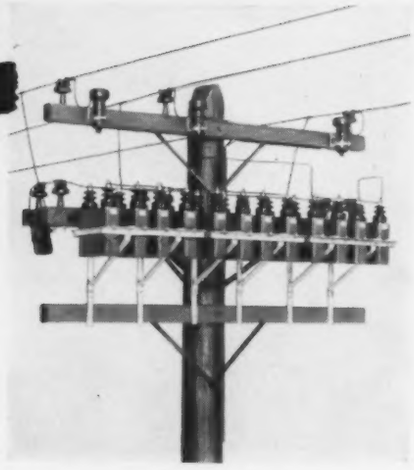
PRINT IN BINDING

GENERAL ELECTRIC

402-3

Capacitors Defer $135,000 Investment

How a California Utility Postponed Installation of a Synchronous Condenser by Investing $30,000 in Capacitors



A 180-kva, 2,300-volt bank of Pyranol capacitors

SITUATION

A growing pumping load—wider use of induction motors—increased wattless current—lowered power-factor—voltage drops—excessive losses—this situation on Salinas Valley distribution circuits of the Pacific Gas and Electric Company was rapidly making corrective measures necessary.

SUGGESTED REMEDY

The first quick survey indicated that a 10,000-kva synchronous condenser, costing $135,000, would be required to improve transmission-line voltage, power-factor, and losses.

PROFITABLE SOLUTION

A more complete examination showed that pole-type distribution capacitors, strategically located throughout the system, could do a similar job and could improve conditions on the feeders as well as on the transmission lines. Pole-type capacitors totalling 3,555 kva were installed at a total cost of less than $30,000.

RESULTS

1. More feeder and regulator capacity was made available.

2. Voltage levels were greatly improved.

3. Investment of $135,000 for a synchronous condenser was postponed for several years.

In addition, flexibility of the capacitor installation makes it possible to closely control power-factor by disconnecting groups of the capacitors as the seasonal load varies.

PROFITS IN CAPACITORS FOR YOU

Is your system also suffering from "growing pains"? If increasing power demand is overloading your feeders and substations or if poor power-factor with its resultant low voltage and high losses is hampering your distribution system, investigate the possibilities of G-E Pyranol capacitors. More often than not, they prove to be the profitable solution. Ask your G-E representative about G-E Pyranol capacitors, or write for Catalog GEA-3333. Address General Electric Co., Schenectady, N.Y.

GENERAL ELECTRIC

407-4

EASY . . . to demonstrate . . . to sell . . . to install

WIREMOLD'S NEW TWIN LAMP FLUORESCENT LIGHTING UNITS

- Special ALZAK distributing type reflectors.
- Completely SELF-CONTAINED ready to install.
- High Power Factor 2-lamp Controls.
- SMOOTH, streamlined, dust-shedding exterior.
- Wired COMPLETE with loops for hanging and 8 ft. wire leads.
- CORROSION resisting aluminum lacquer finish hood.

You have wanted well-designed, high quality, easy-to-sell and install Fluorescent Lighting Units, that would be equally suitable for industrial and commercial use.

Wiremold has waited until we could give you such units so RIGHT in design and construction that we stand squarely behind them with the same guarantee that covers every item in the Wiremold lines.

Now these New Wiremold Twin-Lamp Fluorescent Units are READY . . . a distinct advance in design, construction and overall efficiency at a price that enables you to sell Fluorescent Lighting for an increasingly wide range of applications.

Note the many unusual features of these attractive new units, their quality, construction and attractive appearance. Lose no time in sending for detailed information and prices. Also, be sure to have at least one unit for display and demonstration purposes.

Write direct to Hartford or to your local Wiremold representative.

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F. A. STROHECKER, 2207 First Ave., South, Seattle, Wash.

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NEWS OF THE INDUSTRY

SUPREME COURT RULES DOWN S. F.-PG AND E CONTRACT

The United States Supreme Court ruled on April 22 that San Francisco's power contract with the Pacific Gas and Electric Co. is illegal, creating the most serious problem for the city since Hetch Hetchy was developed. Legal opinion construed the ruling as meaning that the city must go into the power business unless a way can be found to avoid it.

The following possibilities were deducted from official comment: San Francisco must build, buy or lease all or part of a power distribution system and retail directly to the consumer; the Raker Act must be amended to legalize the practice the high court held illegal; a compromise might be affected whereby the city could use PG and E distributing system by retaining title to Hetch Hetchy power; the city will have the power generated from Hetch Hetchy water.

Government attorneys were quoted as saying that "San Francisco would have to acquire a distribution system of its own and distribute power that way, or arrange for the company to distribute the power without having control of it."

This would mean that the city would continue to use PG and E as an agent for purposes of distribution providing San Francisco retained title to its power instead of selling it. In that case, it was stated, PG and E could be recompensed by the city for the use of its facilities.

One thing was definitely evident. The city's budget would be thrown out of balance because the city would lose $2,000,000 or more in revenue it has been obtaining from PG and E from the sale of power. Loss of this sum would increase the tax rate as much as 30c.

The San Francisco supervisor introduced a resolution calling upon the Public Utilities Commission to investigate, report and give cost estimates on ways of utilizing Hetch Hetchy power. He suggested increased use of energy by the Municipal Railway, in street lighting and in public buildings.

Another fact remains evident in the controversy and it is that on seven different occasions, the city's voters have refused to set up a municipal power system. The last vote resulted in a severe setback to municipal power boosters.

WIRE BITES DOG!

Serviceman Harold Stoddard of The Washington Water Power Co. was taping the hot wire on a meter installation while standing on the first rung of a step ladder recently. Getting a shock and simultaneously feeling a nip on his leg, Harold looked around and saw a surprised pooch lying feet skyward on the ground. The dog soon recovered, however, and with a startled "yipee" headed tail-down for the western horizon. The current had evidently gone to ground through Stoddard and the dog; the dog, by reason of his standing on damp ground came out second-best. —*The Illuminator.*

PG AND E SUED BY TAXPAYER FOR $75,000,000

A San Francisco taxpayer filed suit on April 25 to collect $75,000,000 from the Pacific Gas and Electric Co. for illegal sale of Hetch Hetchy power to San Francisco consumers. The suit was filed in Federal Court by a Mrs. Henrietta Wright.

Mrs. Wright charges the PG and E resale of Hetch Hetchy power has averaged $8,000,000 annually since 1925. Of the total income of $100,000,000 she claims the city has received only $25,000,000. Her suit sought to recover the difference for the City of San Francisco.

The suit asks that PG and E be established as "trustee" of the funds and that judgment be entered for hte difference in favor of the city.

UTAH SUPREME COURT SAYS COOPERATIVES NO UTILITY

In a unanimous decision, the Utah Supreme Court held that the state Public Service Commission has no jurisdiction over non-profit electric power cooperatives, and that such a cooperative is not a public utility.

The court instructed the commission to vacate an order of August 10, 1939, in which the commission assumed jurisdiction over the Garkane Power Co., Inc., plaintiff in the case.

The case came before the court on a writ of certiorari brought by the company, which operates in Garfield and Kane Counties in central Utah.

FEDERAL COURT SETS PRICE ON WASHINGTON PUD

A purchase price of $6,011,556 was set last month by a Federal court jury on Washington Gas & Electric Co. properties condemned in the Longview-Ryderwood region by Public Utility District No. 1 of Cowlitz County. The company had maintained during the four months trial that its properties were worth $7,500,000, while the PUD claimed they were worth only $3,500,000.

The case, first condemnation trial brought against a private utility since PUD districts were formed in the Northwest, was considered a "yardstick" for future condemnation negotiations between public and private power interests.

The jury placed a price of $5,922,556 on Washington Gas & Electric Co. properties and set the value of the company's subsidiary, the Columbia Electric Development Co. at $88,950. The PUD can decline to buy the properties, E. K. Murray, chief PUD counsel, stated.

Chief reason for the wide spread between PUD and Washington company estimates were: the company's "going concern" value; the amount the properties had depreciated; the value of a hog fuel contract the company holds with the Long-Bell Lumber Co. at Longview. The company claimed this contract was worth $1,300,000, while the PUD declared it worthless. The company said its properties had depreciated only 10%, while the PUD set the figure at 39%.

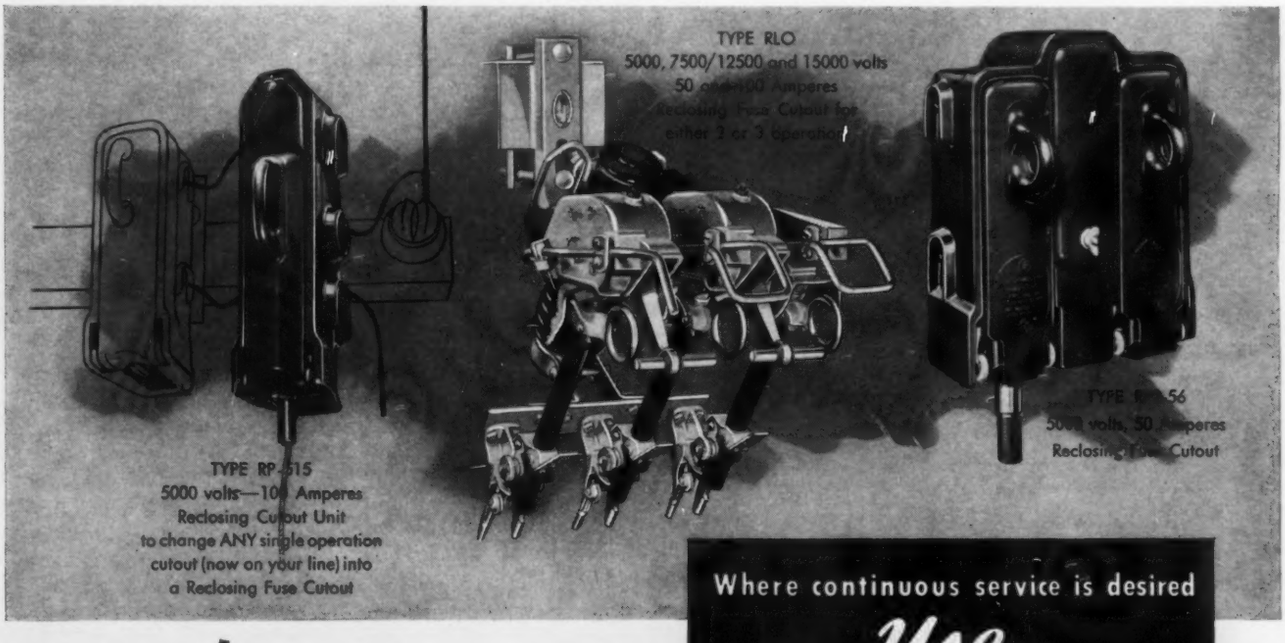
There were rumors that the PUD might begin negotiations with the Bonneville administration.

PUD ORGANIZATION PLANS FOR PUGET SOUND OFFER

Plans for the acquisition of the properties of the Puget Sound Power & Light Co. for public operation, through the organization of public utility district commissioners known as the Consumers Non-Profit Public Power Corp. will take the form of a definite offer within thirty days, according to the officers of the group.

In a public statement by Monte J. King, resident of the corporation, announcement was made of the hiring of James I. Metcalf, nationally known power engineer and economist, as man-

On all your lines **it pays to keep customer meters turning *continuously*** L-M Reclosers prevent many a needless revenue loss, save costs of troubleman's trips . . . and assure your customers better service. That's what we mean when we say that these L-M Reclosing Cutouts pay for themselves many times over in the increased profits and better customer relations they insure. For that point on your line, where continuous service is desirable, L-M offers a complete line of two and three operation reclosing cutouts . . . of various constructions . . . to meet your particular requirements. Ask your L-M representative or write for complete information. **LINE MATERIAL COMPANY,** Milwaukee, Wisconsin.



Where continuous service is desired

Use

L-M Reclosing Fuse Cutouts

ager of the organization. Metcalf arrived from New York recently to confer with officials of the group, bringing with him the results of two weeks of conferences in New York City with banking houses, investment brokers, D. C. Barnes, president of Engineers Public Service Corp., owner of virtually all Puget Power common stock, and other interests concerned in steps to take over the private company's operations in Washington state.

As a result of the conferences, an offer will be laid before the Engineers Public Service Corp. within a month, rather than with local company officials, King states.

Metcalf to Confer

Metcalf's first step in Seattle will be to proceed with an analysis of the company's property and business as it now exists, to determine "what can be paid for the company's business." He will also confer with officials of Seattle City Light and the Bonneville Administration, with which he was formerly connected, to seek their cooperation not only in the purchase plan, but in subsequent coordination of the private system with the municipal and federal projects, King said.

The corporation's statement of "basic principles and plans" includes a provision "whereby every organized public utility district on the Puget Sound system can commence business immediately after the acquisition, under a fair lease, purchase and power contract, every district affected to be treated on an equal basis."

It also provides "means whereby clear title to the company's property and business in competition with City Light can be deeded to the city of Seattle immediately after the acquisition."

One of its principal aims is "to enable all public utility districts and City Light to make an immediate rate reduction—first of a series of progressive rate reductions to eliminate the present five-million-dollar annual overcharge and give the Puget Sound area the lowest rates in the country."

Sound Program

One of the corporation's plans to "initiate a sound program for the development of new industry" is "to offer and expect from the Bonneville power administration, the Bureau of reclamation and the REA the utmost cooperation—to the end that the accomplishment of this plan and program may make a constructive contribution to the federal power program in the Pacific Northwest."

The plan contemplates also a means of interim operation of the private properties by the corporation so that final allocation of sections to individual PUDS can be made on the basis of at least two years actual operating experience. The basis, King states, is to be recommended by an impartial advisory committee of outside public power experts, one to be named by Governor Martin.

Tentative financing program contemplates authorization of a bond issue by the nonprofit corporation, the issue to be distributed to investors through the syndicate presumably already being organized in New York. These bonds, it is reported, would be retired over a period of time as the property is distributed to districts which may authorize revenue bond issues of their own. It is pointed out that any financing plans are subject to final determination of price to be offered and the general purchase proposal and subsequent plans for operation.

President Frank McLaughlin of the Puget Sound Power & Light Co., declared the program of the cooperative sounded like a "blitzkrieg on paper," and declared that there has to be a plan" backed up with evidence of ability to perform—real cash on the barrel head—and a withdrawal of condemnation suits" before his company would take steps. He also reiterated that "our company is not offering its properties for sale."

Rival PUD Group Also Plans For Puget Sound Acquisition

The newer-organized Public Utility District Commissioners Assn. of Washington, at a recent meeting, voted to continue with its present plans for acquisition of the Pacific Northwest holdings of the Puget Sound Power & Light Co. Association members voiced strong criticism of Guy C. Myer's contract with the recently formed Consumers Non-Profit Public Power Corp.

Under the association's program, attorneys for the various PUD districts are working on the formation of an organization to acquire all the properties of the power company. Important PUD requirements outlined include: approval by commissioners and attorneys of each district; negotiations conducted through representatives not employed on a commission. It is declared that Myers as agent for the corporation would receive a commission if purchase was effected; reasonable compensation if it was not.

The PUD program would leave a way open for possible RFC funds, and the purchase, if financed through private bankers, would be on an open bid basis, with various financial houses having an opportunity to compete for the revenue bonds.

PG and E Signs Contract With Edison Company for Power

A contract under which the Southern California Edison Co. will supply the Pacific Gas and Electric Co. with 150,000 kw. of assured capacity during 1942, 1943 and 1944 was approved April 12 by the California State Railroad Commission. This contract also assured PG and E of 75,000 kw. in 1941, with an option to take up to 100,000 kw. in 1945.

Approximately $6,500,000 will be expended by the Edison company in fulfilling the demands of the contract, according to Fred B. Lewis, vice-president and general manager. A second transmission circuit from Boulder Dam will be built, new switching equipment will be installed at a cross-over station and several major sub-stations, and various other additions will be made to the company's main transmission system. Arrangements have been made with the federal government for the installation of addition generating facilities of 82,500 kw. capacity at Boulder Dam. Two such generators now are in use by the Edison company. Cost of the project given above does not include the latter item. Construction operations are expected to begin about Aug. 1, and will be completed before Jan. 1, 1942.

Decision to supply increasing demands for power in its service territory by purchasing power from the Edison company rather than installing additional generating facilities of its own was made by PG and E in order that it will be in a position to absorb a large amount of power which will be made available in 1945 from the Central Valley Project's Shasta Dam. Additions now being made to its generating system will take care of added load until the beginning of 1942.

Increasing demand in Edison territory is expected to require the addition of generating facilities by 1945, which will be met by the facilities which then will be released by PG and E for use on the Edison system.

Provisions of the new contract will be met by the Edison company by power generated at its plants in the Big Creek-San Joaquin River hydro-electric project northeast of Fresno. Such Big Creek power now being used in Southern California will be replaced by Boulder Dam power brought in over the new transmission system. At present Edison has 75,000 kw. of inter-connection transformer capacity at its Magunden substation to supply PG and E with its present allotment of power. A proposed additional point of interconnection of the two systems will be located between Big Creek and Fresno.

Henry Dormitzer, Electrical Contractor who installed Teletalk System at Carter, Rice & Company, Boston.

"It took 225 man-hours to install this system . . . it has required no service . . . any qualified contractor can install Teletalk."

IT'S always good business to heed the voice of experience, particularly where a contractor comes through with a truly successful job—one upon which you can build—one that points the way in very definite fashion to PROFITS.

The contractor who has such a message this time is Mr. Henry Dormitzer and he writes: "Carter, Rice & Company had another system for about a year which gave them a great deal of trouble. They installed the Teletalk system over a year ago and have not had to go back for any repairs; it has been positively trouble-free since installation. It took about 225 man-hours to install the system. Any qualified electrical contractor can install this system."

This is but one example of what you can do with Teletalk —and Teletalk does not limit you but does allow you to sell installations from the smallest requirement to unusually large ones—the profit is there (1) in the sale of Teletalk (2) in the necessary equipment for installation (3) in the labor.

Make a step in the direction of this kind of profit and write for literature and the name of the nearest Teletalk distributor.

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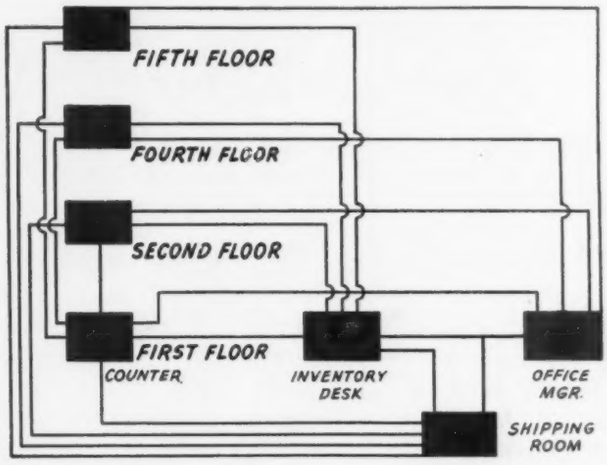

(above) *Diagram of installation at Carter, Rice & Company, Boston, Mass.*

(below) *Teletalk at counter of Sales Office, first floor.*

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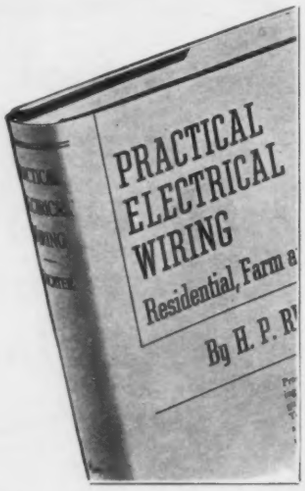
Just Published!

How to wire for light and power



Step-by-step methods fully and simply explained in this new book.

Practical Electrical Wiring

Residential, Farm, and Industrial

By H. P. RICHTER

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Here is a complete course of instruction for those who want to learn how to do electrical wiring. Begins with very first elements of the subject and takes the reader by easy steps, plain instructions and methods, to the completion of typical wiring jobs in accordance with official requirements. The author uses simple language, confines theory to the minimum necessary for understanding the *why* and *how* of the work, and covers fully residential, farm, and industrial wiring jobs of the types that are most in demand.

Covers:

I. Underwriters and codes; electrical principles and measurements; basic devices and circuits; wire, sizes and selection; connections and joints; residential and farm motors; etc.

II. Planning an installation; specific outlets; switches and other devices; old work; farm wiring; isolated lighting plants; wiring apartment houses; etc.

III. Planning non-residential installations; non-residential lighting; miscellaneous problems; wiring for motors; wiring schools, offices, stores, churches; etc.

From this book the reader, even one with no previous knowledge of electricity, can get the ability to do all kinds of medium-voltage wiring jobs in accordance with official requirements. He will get familiarity with all the materials and equipment of wiring, and a practical command of each step in planning electrical installations for various purposes, and handling and installing all parts of the necessary circuits and devices.

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New Boulder Dam Power Bill Introduced in Washington

A new bill to revise the financial arrangements for the sale of power from Boulder Dam has been introduced by Representative James G. Scrugham of Nevada; Scrugham introduced a similar bill last year but it was withdrawn because the interested parties failed to reach agreement.

As introduced, the bill gives Los Angeles and the other power users lower rates for power. The lower basin states, Arizona and Nevada, each get $900,000 right away and $300,000 a year from then on, though losing the future possibility of a larger sum. The upper basin states get $500,000 a year for the Colorado River Development Fund, again at the sacrifice of larger sums in the future. And the government gets closer control over the generating plant, now operated under lease by the power users.

Power rates as present are set to conform to rates prevailing in the load centers. Out of the proceeds is met, first, cost of operation and maintenance, second amortization at 4% over fifty years of the $125,000,000 advanced by the Treasury to Colorado River project. Anything left over is to be distributed among the downstream states and a fund for development of the upper river. Nothing has yet been left over, but at the present 1.65-mill rate for power considerable sums will be left over in future.

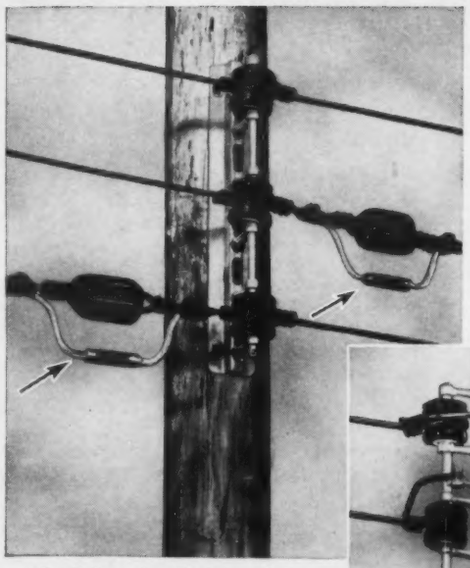
Bill Would Reverse Procedure

The proposed bill would reverse this procedure and require that power rates be set at a level which will cover operation and maintenance, payment of $600,000 to the downstream states and $500,000 to the development fund, and amortization. This last would be substantially reduced by changing the interest rate to 3% deferring repayment of the $25,000,000 allocated to flood control for fifty years, no interest being charged meanwhile.

The present contracts under which the power users operate the generating plant would be cancelled and a new contract drawn by which the users would operate the plant as agents of the Secretary of the Interior—giving him closer control. It would be possible, under the bill, for the secretary to operate the plant himself, but the power users seem confident this will not be done.

Possibility that the state or local governments might tax the power operations is eliminated by a clause stating that the payments to Colorado and Nevada are in lieu of taxes and that any taxes levied will be deducted from the payments.

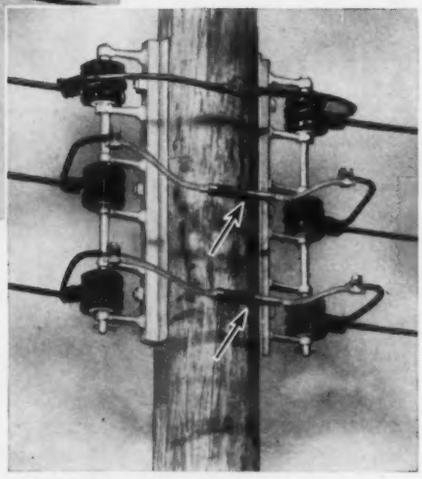
USE SECONDARY FUSING



S & C Secondary Link installation at single rack with strain insulator dead ends.

to:

- Increase your distribution transformer protection against excessive peak loads and high impedance faults



Installation of S & C Secondary Links at double secondary rack dead end. Note metal cylinders extending from shell, *indicating* that links have blown.

and to:

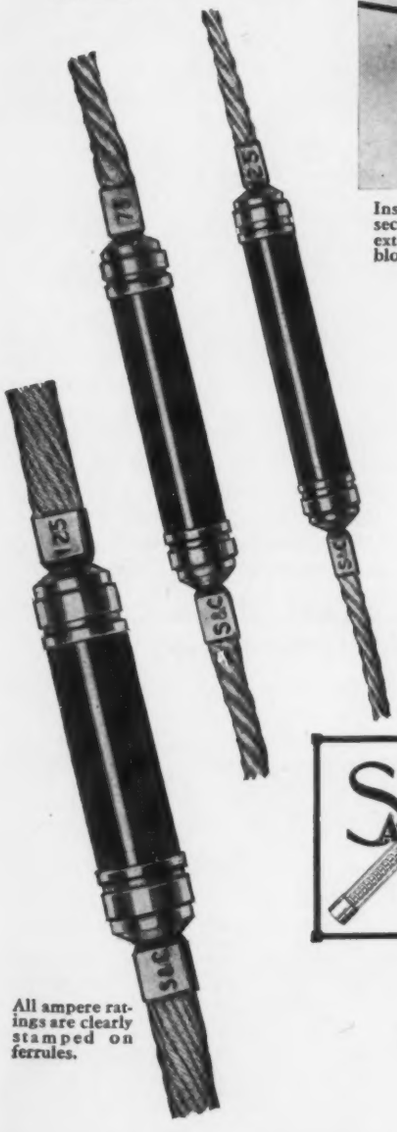
- Improve your regulation, reduce lamp flicker, and use transformer capacity more efficiently, by "banking" your secondaries through fuses.

The NEW S&C Indicating Secondary Fuse Links

will help you realize these advantages on your system at low cost. The features are:—

- Clear indication after blowing
- Link remains intact after blowing
- No dangers due to loose cable ends dropping from line conductors—

plus the accuracy, mechanical strength, and reliability you expect of any S & C fuse device. Bulletin 218-A includes specific data and installation suggestions.



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Alcoa Signs Additional Contract with Bonneville

To care for heavy consumption of aluminum due to present demands of industry and the Government's preparedness program, Aluminum Company of America disclosed last month that it had made an additional contract with Bonneville which would permit the doubling of the capacity of the new metal producing plant now under construction at Vancouver, Wash.

Due to the unusual conditions existing at present the new contract, which is for 32,500 kw. of additional power, is limited to a five year period. It means that the new plant now being built at Vancouver will be doubled in capacity so it can produce 60,000,000 lb. per annum instead of the 30,000,000 lb. contemplated when plans were first announced.

I. W. Wilson, vice-president in charge of operations, said, "the present demand makes it advisable to build a Vancouver plant with twice the metal producing capacity originally intended. How long this heavy demand will prevail we cannot tell, but it seems wise to contract with Bonneville for the additional power needed at this time as a supplement to the long term contract we made last December when we decided to locate a plant in the Northwest."

Ziebarth Low Bidder on Another Bonneville Line

Fritz Ziebarth of Long Beach, Calif., was low bidder on construction of the Bonneville Power Administration's 4½-mile transmission line to serve the new reduction plant of the Aluminum Company of American near Vancouver, Wash. Ziebarth's offer was $121,912. Only other bid offered was that of the Calowell Construction Co., Bakersfield, $169,399.

The new line will be of steel tower construction. It will carry energy at 110,000 volts from Bonneville's bus bar at its power substation near Vancouver. It is designed so that it can be adapted to serve the industry with as much as 200,000 kw. if expansion should ever require such service.

It will follow the right-of-way of Bonneville's already completed Portland circuit from the Vancouver substation to the north shore of the Columbia. From that point it will run west to the site of the Aluminum company plant on which preliminary construction work has been under way for several weeks.

The Bonneville administration also awarded a contract for the construction of its 230,000-volt line between Kelso and Chehalis, Wash., to the White City Electric Co., Chicago. The line will be completed during the summer months.

Bid Submitted to Ellensburg (Wash.) by Bonneville

Contract for the sale of 2,200 kw. of Bonneville power to the city of Ellensburg, Wash., municipal electric system was submitted last month to the Ellensburg city council by the Bonneville Power Administration.

At present Ellensburg is served by its own hydroelectric generating plant but recent studies have indicated that the city's power load is expected to grow in the near future, making it necessary to purchase additional power.

Engineers estimate that by 1945 Ellensburg would save $34,500 annually if it purchased power from Bonneville under the proposed contract, which provides for the delivery of energy at the wholesale price of 75c per month per kw. of demand plus 2½ mills per kw.-hr. of use.

● PROVO'S NEW MUNICIPAL POWER PLANT was officially put into operation last month, when Mayor Mark Anderson threw a switch at a special morning program, turning current from the plant into the distribution system. Anderson later reviewed the history of the efforts to obtain a municipal power plant, following which the plant was thrown open for public inspection.

BRIEGEL METHOD Scores at
Golden Gate Exposition

See Advertisement
On Page 15

BRIEGEL METHOD TOOL CO., Galva, Illinois

Seattle Interties with Bonneville for Surplus Power

An intertie of the Seattle's hydroelectric system with the Bonneville Dam project has been agreed upon by city officials, and the Council has initiated the drawing of ordinances embodying a ten-year contract with Bonneville.

The ordinance gives the city full authority to dispense power in its own sales area, and prevents the Federal government from supplying power to any firm or agency in Seattle's present sales area except the Puget Sound Power & Light Co., without consent of the city. In recognition of the existing contract between the city and Puget Sound, for sale of surplus power, the city reserves the right to sell its surplus to the power company in advance of the Bonneville administration.

The agreement with Bonneville is for an exchange of surplus power of each utility when needed by the other. The Federal Government is to construct a substation near Covington, to be connected with the government's existing station at Ampere. The government will connect the Covington substation with a 220,000-volt circuit, and the city will connect one of its 220,000-volt circuits to the government's disconnect switches at the point of delivery.

According to Lighting Superintendent E. R. Hoffman, the city's forthcoming contract with Bonneville Dam administration both will reduce City Light's operating cost and provide a new market for municipal hydroelectric power. It will enable the city to reduce the debt on its plant, and will ultimately result in reduced local rates, officials declare. The contract will enable the city to save money in the operation of its own plant, as the steam standby plant will no longer be needed, Mayor Arthur B. Langlie stated.

Portland PUD Backers Reserve Bonneville Power

Sponsors of a Portland people's utility district last month asked Bonneville Administrator Paul J. Raver to reserve at least 50,000 kw. of firm power, with additional surplus energy, until the PUD issue is decided May 17.

The letter was signed by Harry M. Kenin, chairman of the Bonneville-for-Portland committee, and C. A. Lucas, chairman of the Bonneville service committee.

It averred that the power demands of the Portland area require 25,000 kw. of firm power and varying amounts of dump power up to 80,000 kw., at present.

G-E Wiring Materials*

WERE SELECTED FOR THE WYVERNWOOD HOUSING DEVELOPMENT IN LOS ANGELES, CALIFORNIA

Wyvernwood occupies a 73-acre tract and includes 1102 apartments ranging from 3 to 6 rooms.

A corner in Wyvernwood

Wiring at Wyvernwood

At the Wyvernwood Housing Development in Los Angeles, wiring was installed which is not only adequate to serve lighting and small appliances in each apartment but also to serve electrical ranges and water heaters. The Wyvernwood Development extending over 73 acres and containing 1102 apartments is one of the largest privately financed housing projects in United States. G-E Wiring Materials —including G-E White Rigid Conduit, Electrical Metallic Tubing, Flexible Conduit, Wire and Wiring Devices —were used in the development.

Electrical wiring is becoming increasingly important in home building today —both in single homes and in large-scale housing developments. People want to "live electrically" and they can't do it unless wiring is adequate and dependable.

Benefits of Using G-E Materials

Two features which make General Electric Wiring Materials ideal for single house and apartment wiring are (1) the completeness of the line and (2) the endurance and dependability of the material. General Electric has also developed a wiring plan for single homes called G-E Home Wiring. This plan adapts the efficient methods used in commercial and large apartment house wiring for use in homes.

For further information about G-E Wiring Materials including conduit, wire and cable, and wiring devices or about G-E Home Wiring see the nearest G-E Merchandise Distributor or write to Section CDW-0235, Appliance and Merchandise Department, General Electric Company, Bridgeport, Connecticut.

Witmer and Watson, Architects, Los Angeles, Calif.—Lindgren and Swinerton, General Contractors, San Francisco and Los Angeles, Calif. Newbery Electric Corporation, Electrical Contractor, Los Angeles, Calif.

**G-E White Rigid Conduit, E.M.T., Flexible Conduit, Wire and Wiring Devices*

GENERAL ELECTRIC

Cal-Oregon Power Declares Rate Reductions of $170,000

Rate reductions, aggregating $170,000 annually have been declared by the California-Oregon Power Co. Of this total, $127,000 involves 30,000 patrons of the company in Oregon.

Residential rates will affect 23,000 customers, with a saving of $66,000 a year. General light and power schedules are reduced $29,000 and involve 3,600 patrons. A total of 900 general power service customers will save $26,000.

The top step of both residential and commercial lighting schedules has been reduced from 6c to 4½c per kw.-hr. The new rates became effective May 1.

Mountain States Reduces

Rate reductions totalling $180,600 annually by the Mountain State Power Co. were announced recently by State Public Utilities Commissioner Ormond R. Bean. The reductions affect the Willamette valley, Coos Bay and Tillamook areas.

These reductions follow a $105,000 rate slash in 1938 and one in 1939. Total annual reductions to Mountain States customers since Jan. 1, 1938, exceed $365,000. Both residential and commercial rates are involved in these latest reductions.

● THE UTAH PUBLIC SERVICE COMMISSION has been requested to order a reduction in street lighting rates in Gunnison, Salina and Richfield, served by the Telluride Power Co. Public officials of these communities told the commission they believed the lighting rates in the communities to be among the highest in the state.

● BOULDER DAM POWER lighted the homes and stores in Goodsprings, Nevada mining community, for the first time recently, marking a new era of progress in the area. Electrical energy is supplied by the Southern Nevada Power Co., Las Vegas, which constructed the power line leading to Goodsprings. A connecting link was built to the industrial supply line serving the Yellow Pine mining district, which went into service last October.

Possible Shortage of Water for Power Feared in Northwest

With snowfall for the past winter less than half of normal in the Pacific Northwest, concern over a possible shortage of water for power purposes is expressed by power engineers in the district. Eugene R. Hoffman, City Light, Seattle, declared that rainfall in the next few months may make up for the lack of snow, and stated that in case of shortage of water power, City Light would depend on the Lake Union steam plant and tie-ups with the Tacoma municipal system and with the Puget Sound Power & Light.

● MEASUREMENTS for regular snow courses in California's Sierra Nevada eastern and western slope region indicate that there is about three-quarters of a normal snowpack. The average for the watersheds is set at approximately 73% or normal. This is a better snow crop than last year, but not as heavy as the preceding year. It insures ample water for all of California's needs for the coming summer and carries little threat of floods even at the peak of snow melting period. Late summer flows should be good because of above normal quantities of snow at high elevations.

House Committee Slashes $500,000 from Parker Project

A house appropriations committee last month cut $500,000 from the Interior Department's estimate of $3,500,000 for the Parker Dam project for the fiscal year starting July 1.

The figure for the All-American Canal project was in turn, boosted from $1,000,000 to $1,500,000. The committee proposed an appropriation of $4,000,000 to complete power and other installations at Boulder Dam.

The committee said it did not believe the $500,000 reduction for Parker Dam would seriously delay the ultimate date of completion of the project.

Elephant Butte Power Sold To El Paso and Las Cruces

Contracts have been approved by the Reclamation Bureau for sale of 46,000,000 kw.-hrs. of electrical energy from the Elephant Butte hydro-electric project on the Rio Grande at Hot Springs, N. M., half the project's potential annual output of 90,000,000 kw.-hrs.

The 20-year contracts provide 40,000,000 kw.-hrs. annually to El Paso and 6,000,000 kw.-hrs. to Las Cruces. The El Paso contract will return $140,000 a year to the Government. Under a ruling by Secretary of Interior Ickes, only 80,000,000 kw.-hrs. of Elephant Butte's total capacity will be sold for public distribution. Half of it was allotted to Texas and half to New Mexico.

Application for 6,000,000 kw.-hrs. is pending from Hot Springs, and other southwestern New Mexico towns are considering use of this power.

● APPROVAL of a $144,000 program of construction and rehabilitation of Seattle City Light sub stations throughout the city has been made by the city council utilities committee. The City Light Department will furnish all power required to operate the city's new trackless trolleys, and the new equipment and improvements will be needed to handle the job, city councilmen state. They also declare the city will not purchase the sub-stations of the Puget Sound Power & Light Co. E. R. Hoffman, Light superintendent, states the work includes rehabilitation of five present substations, and construction of two modern stations of the latest automatic type.

● WORK HAS BEGUN on 268 miles of electric line in Adams, Franklin and Whitman Counties in Washington, according to the REA administration at Washington, D. C. The Electric Contracting Co., Seattle, was successful bidder on the job at $172,385. The Big Bend Electric Cooperative, Inc., is the sponsor.

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THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE
NOW—lower prices and higher capacities
There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.
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Here's the Result

A clamp of special length with high ultimate strength and very high slip strength.

Arcing horns; 36 inches long, ¼ x 2½ inch, with special tips.

Special heavy duty, horn supporting fitting.

Extraordinary corona performance.

More than a Forging ...A Service

Perhaps it appeared a bit odd to see the illustration of this clamp running vertically on the page.

However, we wanted the engineers to examine it closely, and to do so we utilized all the space possible.

Here is just another example of the service at the disposal of the buyer of BTC hi-line hardware.

BTC cooperates with the utility engineer and insulator manufacturer in the designing and production of difficult hardware. Play safe, use the service of men who know forgings as well as the requirements of hi-line hardware.

BTC

THE BREWER-TITCHENER CORPORATION
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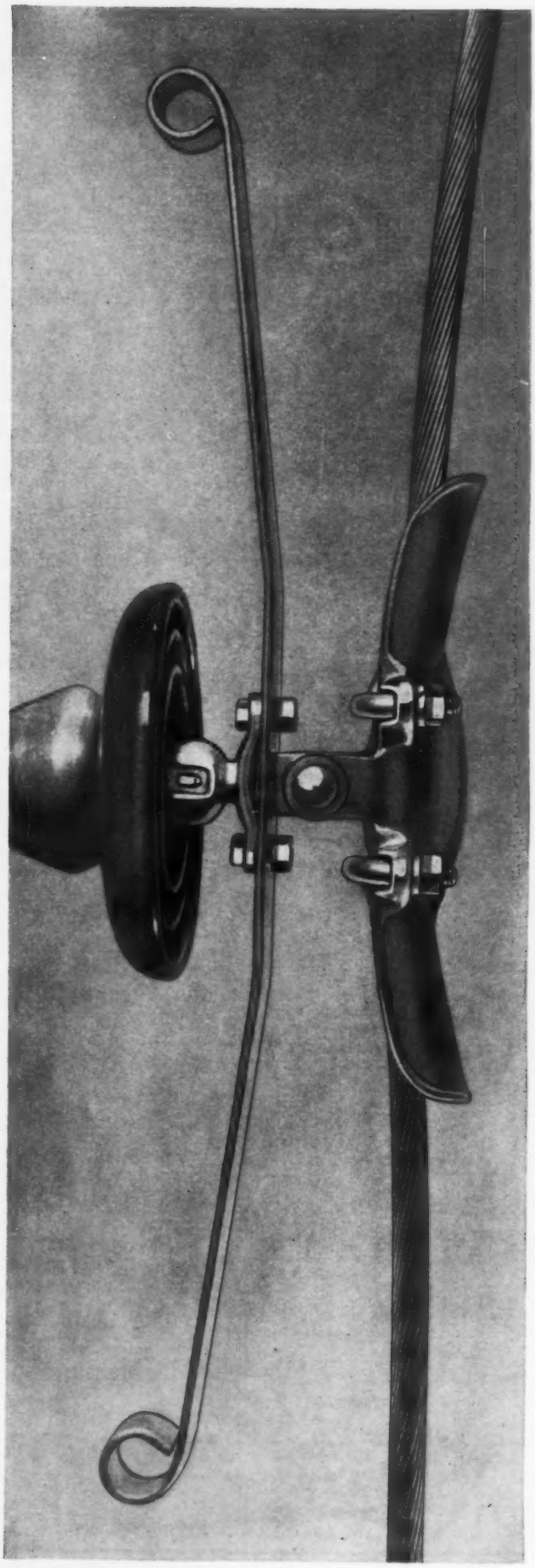

Contracts Awarded

To J. H. McRae Company Ltd., Vancouver. for electrical installation in the new $52,000 marine and stores building for Royal Canadian Air Force, Jericho Beach, Vancouver.

To C. H. E. Williams Co. Ltd., Vancouver, for electrical installation in the new $99,000 girls vocational school at Vancouver, B. C.

To W. A. Patterson Co., St. Paul, Minnesota, for building 70 mi. of line to serve 152 members of The Kootenai Rural Electrification Assn., Inc., Coeur D'Alene, Idaho, $50,703.

To Hagen & McClintic, Trinidad, Colo., for building 97 mi. of line for The Fall River Rural Electric Cooperative Inc., Ashton, Idaho, $66,180.

To D. M. Manning, Hysham, Mont., for building 59 mi. of line for The Yellowstone Valley Electric Cooperative, Inc., Huntley, Mont., $51,936.

To Homer G. Johnson, Portland, Ore., for building 292 mi. of line for The Stevens County Electric Cooperative, Inc., Colville, Wash., $212,107.

To Bennett & Taylor, Los Angeles, for building 189 mi. of lines for the Pend Oreille Electric Cooperative, Inc., Newport, Wash., $115,459.

REA Activities

Orcas Power & Light Co., Eastsound, Wash., has been awarded $10,000 for member service extensions; $21,000 to provide for additional generating capacity.

Malheur Cooperative Electric Assn., Vale, Ore., has been allotted $10,000 for wiring.

● Erection of a radio transmission tower for emergency dispatching of line crews of the Washington Water Power Co., Spokane, with completion of the installation—a two-way emergency short wave radio station by May 1, was started on April 15, by the Spokane utility. The station will have a power output of 50 watts operating on a frequency of 2,292 megacycles.

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TREE TRIMMING EQUIPMENT
TREE SURGEONS' TOOLS
Bartlett Manufacturing Co.

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For the Coast Trade

At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.

Driver-Harris Company
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Nichrome

TRADE NOTES

● Don J. Murray has been appointed sales manager for General Electric conduit products, with headquarters at Bridgeport, Conn. He was formerly district representative for wiring materials at Los Angeles, where he has been for the past three years. Murray joined General Electric at Schnectady in 1928. transferring to Bridgeport a year later. Field assignments which followed included posts as wiring materials representative at Richmond, Va., Baltimore, Md., and Boston.

● The Apex-Rotarex Corp., Oakland. will make Spokane a direct operation point. Frank J. MacDonald of Spokane, formerly manager of the electric appliance division of Hughes & Co., Spokane, has been appointed district representative.

● E. Stuart Carter, former sales manager, Harper-McGee, Inc., wholesale appliance dealers, has been named vice-president of this 22-year-old firm. Carter was connected with RCA Victor Corp. for twelve years prior to joining Harper-McGee.

● The Claflin Furniture Co., Helena, have entered the electrical appliance business, and will carry a full line of General Electric products. Leverett Ropes has been named manager of this new department.

● Dates of the third annual Southern California Home Show are May 25th to June 5th. This show, plans for which are more ambitious than ever, will be held in the Pan-Pacific Auditorium. Last year more than 150,000 people attended this outstanding selling event. The electrical section of the exhibit is being managed by Robert Steel. It is designated as the "Electrical Age Exposition," and space is still available to those who wish to participate in it.

● Sutton and Landry have been appointed manufacturers' representatives in the nine western states of the Kisco line of electric fans, etc. The firm, with headquarters at the Western Furniture Mart, San Francisco, also represents Detroit Star electric range, White Star washing machine, Economaster electric heaters, Jim Dandy electric chimes. Kent coffee brewers, Simplex ironers and Humidome electric humidifiers.

● Herb Names, Inc., is Denver's newest retail appliance store. Managed by Herb Names, formerly with the Chas. E. Wells Music Co., the store will handle a full line of electrical appliances.

● FRIGIDAIRE DIVISION, General Motors Sales Corp., again will be represented in the General Motors exhibit at the 1940 Golden Gate Exposition in San Francisco. The exhibit will incorporate a number of colorful and unusual display units for showing Frigidaire's line of products.

● J. W. RYALL, formerly associated with B. & R. Electrical Supply Co., has opened up his own place of business, the Ryall Electric Supply Co., at 1518 Glenarm Place, Denver. His organization will handle complete lines of wiring, conduit and other electrical supplies.

● RALPH B. JOHNSON has taken over the secretarial duties of J. F. Fenwick, who retired from The Hawaiian Electric Co., Ltd. Active management of the company's merchandise business, formerly handled by Fenwick, has been assumed by Paul H. Anderson, merchandise sales manager.

● C. R. HUNT, manufacturer's agent located in the Rialto Building, San Francisco, is now handling the Rapid Electroplating Process, Inc. for the Pacific Coast.

● LANDERS, FRARY & CLARK have announced the appointment of The Electric Corp., Los Angeles, as exclusive distributor for Universal ranges and home laundry equipment in the southern California territory. North Coast Electric Co., Seattle, will be exclusive distributors for the same lines.

●

Moved

● WAGNER ELECTRIC CORP., 475 - 9th street, San Francisco, recently enlarged their quarters, the second floor of their present location being taken over, and new offices installed.

● THE TORK CLOCK CO., INC. Mt. Vernon, N. Y. have moved into new and larger offices at 1 Grove St., Mt. Vernon.

NOBLE WRIGHT, electrical contractor, San Francisco, from 753 Leavenworth Street to 290 Tehama Ave.

ALLIED APPLIANCE CO., from 2794 Mission street, San Francisco, to 516 Elm street, San Bruno, Calif.

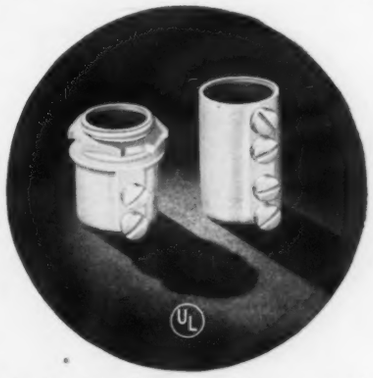
WESSELL ELECTRIC CO. has moved to 4503 Western street, Fresno, Calif.

SCHEIDLER'S HOME ELECTRIC SHOP, at 6214-60 NE, Seattle, moved to 10311 Aurora Avenue and have changed name to Scheidler's Appliance Shop.

M & M Appliance Co., from 49 East 1st South in Salt Lake City to their new home at 123 East 3rd South. A. M. Baker is the new manager.

QUICKER and EASIER

to install KWIKON Set Screw "E.M.T." Fittings



Just a few simple turns with a screwdriver and they're on securely. They're easier to reach in "hard-to-get-at" places, too.

Ask your jobber, or write us, about the new, low prices.

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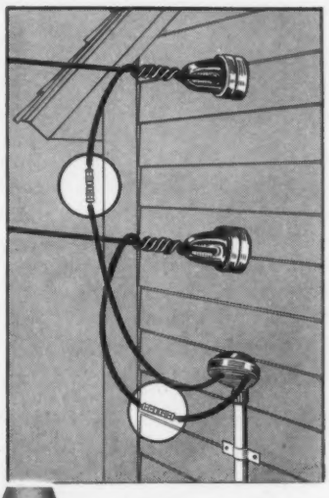

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Nicopress Sleeves are Unsurpassed for making service connections.

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Canadian Mfr.—N. Slater Co., Ltd., Hamilton, Ont.

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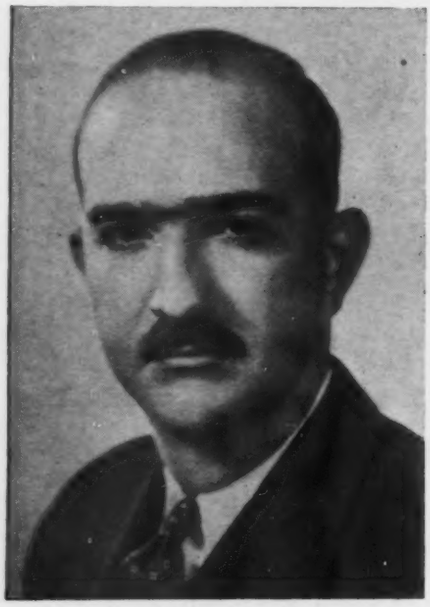
ABOUT PEOPLE

Graybar Awarded Hotpoint Franchise in Northern Calif.

Graybar Electric Co., Inc., has been awarded the franchise for distribution of Hotpoint electrical appliances. Effective April 15, this important change gives Graybar coverage of the well-known Hotpoint line in northern California and Nevada area. Adequate displays will be maintained in the San Francisco, Sacramento and Oakland sales offices.

Clyde E. Allen, formerly connected with Electric Kitchen Appliances, Inc.,



ALLEN

has been appointed merchandise manager for Graybar. A former member of the Hotpoint service and sales staff, and a past president of the San Francisco Electrical Development League, Allen is now making plans for active promotion of Hotpoint appliances.

He will be assisted by W. E. Derbyshire, who was with him in a similar capacity with Electric Kitchen Appliances. Several other members of his former staff will also assist Allen in his new position. D. H. Capelli, former merchandise manager for Graybar in San Francisco, has been transferred to Salt Lake City, where he will be merchandise manager.

WWP Line Foreman Presented With Edison Life-Saving Award

Axel Melander, Pullman line foreman, the Washington Water Power Co., has been awarded The Edison Electrical Institute Life Saving Award for his quick action in saving the life of Denis Robertson on Oct. 12, 1939, Robertson, a member of Melander's crew, came into contact with a "hot" 6,900-volt line, while moving feeder wires, receiving a severe shock, and injuries from a fall from the pole.

Melander, finding that Robertson's heart action and breathing had stopped, applied artificial respiration until breathing and heart action had returned to normal.

The award, consisting of a medal and a certificate, was presented to Melander at a Pullman Chamber of Commerce luncheon, April 2.

Pacific Power & Light Names Service Pin Employees

Eighty-two members of Pacific Power & Light Co. were awarded service pins at company meetings recently. Twenty-five year pins went to S. A. King, Yakima; A. K. McAlpin and Hjalmar Paulson, power department; F. G. Thompson, Yakima. Twenty year pins were awarded to A. S. Barr, Walla Walla; Charles R. Bailey, Yakima; R. I. Carpenter, Astoria; J. J. Conlin, Walla Walla; E. E. Fuls and E. E. Henry, Bend; Ray P. Kinne, Heppner; H. M. Lind, Portland; Robert E. Lee, Astoria; W. J. McFarlane, Pasco; R. F. Neal, Yakima; J. F. Watkins, power department; R. M. Wolf, Walla Walla; and L. I. Carpenter, Astoria. Twenty-eight persons received 15-year pins.

● WILLIAM "BILL" FLOOD, secretary of The Electric Club of Washington, and member of Puget Sound Light & Power staff, has resigned to take a position with The Carnation Company. He is succeeded at the Electric Club by Roger Walker, service superintendent of Puget Power.

● A. H. "AL" NICOLL, who left his position of San Francisco district manager of Graybar Electric Co., to become assistant to the president of that organization in New York was made a vice-president and director of the company last month.

● DEWEY SUMMERS of the Boyle Furniture Co., Ogden, Utah, was the first Frigidaire salesman in the United States to qualify as a member of the 1940 Frigidaire B. T. U. club. Summers reached his full 1940 quota on the 10th of February, after only 35 selling days.

● EDWARD T. HALL has recently been placed in charge of Adequate Wiring promotion for the southern division territory, Utah Power & Light Co.

McBain New Purchasing Agent For Portland General Electric

B. T. McBain, tax agent for Portland General Electric Co., Portland, Ore., for the past ten years, has been appointed purchasing agent. McBain came into the utility industry from the paper field. He was once resident man-

McBAIN

ager in the Northwest for the Willamette Pulp & Paper Co. and later operating manager for Crown-Willamette Paper Co. after the merger of these two companies. Subsequently he left Crown-Willamette and conducted his own engineering office as a consulting engineer in the pulp and paper field.

● GLEN H. BELL, superintendent of the Inland Empire Rural Electrification Inc. in Spokane, Wash., since 1937, has resigned to take a position with the Bonneville authority. Henry Anderson, former REA line inspector, has succeeded Bell.

● A. V. THOMPSON, former member of the General Electric sales organization in San Francisco, has been appointed manager of the utilities division of the Golden Gate International Exposition for 1940.

● HENRY THOMAS MCEWAN, 51, first aid director, Utah Power & Light Co., died March 31, in a Salt Lake City hospital following an illness of several months. He had been in charge of company first aid activities for the past five years, and was captain of the company's first aid team in 1930, the first group of its kind organized among employees. At the time of his death, Mr. McEwan was president of the Red Cross Instruction Club of Salt Lake City and vice-president and past president of the Utah-Nevada Safety Society.

For the First Time Anywhere

GENERAL ELECTRIC IRON and IRONING BOARD COMBINATION DEAL APRIL 1st to JULY 1st

G-E "DIAL-THE-FABRIC" AUTOMATIC IRON (Cat. No. 119F114) $8.95

•

G-E "MET-L-TOP" IRONING TABLE (Cat. No. 78X512) $5.95

Total Value $14.90

LIMITED TIME OFFER

BOTH FOR

$9.95

WITH YOUR OLD IRON

PRICE $11.95 WEST OF THE ROCKIES

G-E "DIAL-THE-FABRIC" AUTOMATIC IRON

1. Streamlined.
2. "Dial the fabric" heat control.
3. Compensating thermostat.
4. Moulded handle and thumb rest.
5. Fast heating Calrod unit produces even soleplate ironing temperature.
6. Button nooks to save buttons.
7. Chromeplate finish, attractive, durable.
8. Heel rest to save lifting.
9. Long-life cord set, moulded rubber plug.
10. 1000 watts for faster ironing.
11. Weighs only 4½ pounds.
12. List price $8.95.

G-E "MET-L-TOP" IRONING TABLE

1. All metal—will last a lifetime.
2. Lightweight—warp-proof—fireproof.
3. Vapor-vented—vents carry off steam and aid in faster ironing.
4. Patented folding legs—fold easily without adjustment.
5. Rigid construction—standard size.
6. List price $5.95.

COMPLETE ADVERTISING PROGRAM

THIS OUTSTANDING OFFER is backed by a complete advertising program which includes: Broadside, Cat. Pages, Folders, Handbills, Pennants and Newspaper Ad Mats.

•

See your G-E Distributor at once to tie in with this complete merchandising offer.

GENERAL ELECTRIC

BRIDGEPORT, CONN. ONTARIO, CALIF.

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PROFILES OF THE MONTH

Vern C. Brown, president and general manager, Brown's Radio Studios, Ogden, Utah, has been elected chairman of the Ogden Electrical League, succeeding Fred Schoss. A. N. Vendall, Utah Power & Light, was re-elected secretary

S. C. Smith (right), general manager of Zion's Cooperative Mercantile Institution's wholesale hardware and electrical appliance department, Salt Lake City, was honored recently on his 50th anniversary with the Utah company

Fred Voss (standing) is president of the Rocky Mountain Electrical League, Pueblo, Colo. Seated, E. C. Alexander, (right) W. N. Clark

Don Germond (right), sales manager, Mountain States Power Co., has a word with Jerry Smith, electrical sales manager, Casper Supply Co.

Frigidaire salesmen gather in Wyoming at Casper. Left to right—1st row, Herb Leming, E. W. Johns; 2d row, Earl Sipple, Lloyd Randal, Bill James, F. J. Mosher, W. E. Jones; 3rd row, Fred Higgins, R. L. Splawn, C. A. Large and A. Erickson

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

"COMMANDS MORE SERVANTS THAN ALADDIN'S LAMP"

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

ELECTRIC RANGE AND WATER HEATER PROMOTION

Nationally, electric range and water heater sales are 25% ahead of last year; the new, improved, 1940 models are finding public favor everywhere.

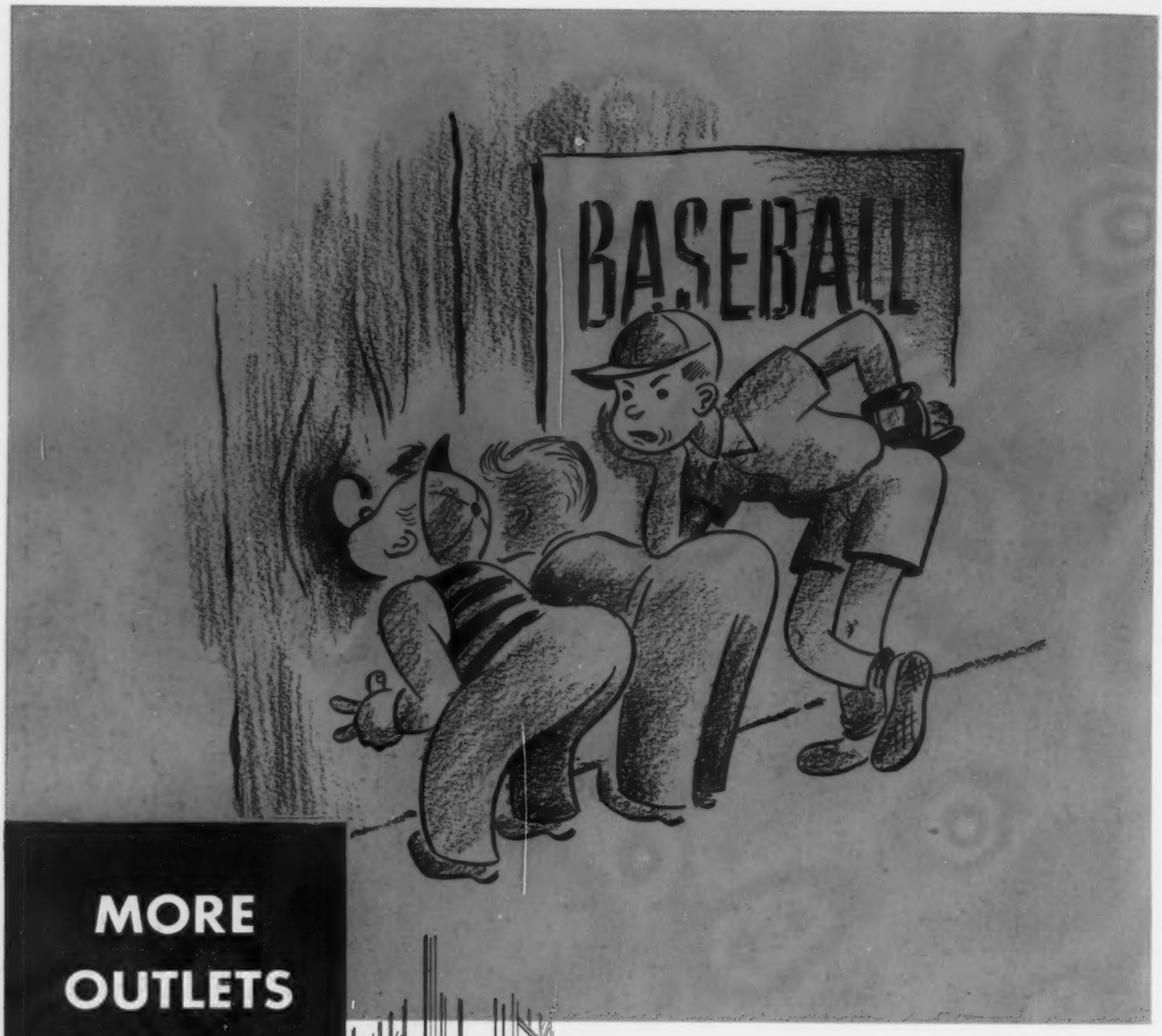
In P.G. and E. territory where the electric range story has been effectively told for many years, the year ahead looks especially promising. Dealers appear to be well stocked, and with any kind of cooperation between manufacturers, dealers and utility, these stocks should m-o-v-e-!

For our part, we will tell the story of fast, cool, economical, completely carefree electric cooking in newspapers and on billboards throughout our electric territory. We will run at least two advertisements during May, and in many papers we will run four advertisements.

Let us tell you how these advertisements can be made to work for you. See our local office—today!

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

EW 105-540



MORE OUTLETS NEEDED

Inadequate home wiring is the "knot hole" of the electrical industry. The electrical age is here, but before electrical dealers, contractors, manufacturers and utilities can sell more products and services, home-owners must be provided with adequate facilities for the convenient use of electrical appliances. New methods of wiring* make it an easy and inexpensive job to modernize the wiring of any home . . . open profitable new markets for electrical appliances and services. Promote adequate wiring and more outlets in every home for maximum profits in 1940 and all the years to come.

** Complete information upon request.*

5-40

PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO

CERTIFIED ADEQUATE PCEB SEAL STAMPING WIRING